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"COASTAL FEVER" AND ENDEMIC TROPICAL TYPHUS IN NORTH QUEENSLAND: RECENT INVESTIGATION, CLINICAL AND LABORATORY FINDINGS.

By M. L. UNWIN, M.B., Ch.M. (Sydney),

Medical Superintendent, Tully District Hospital, North Queensland.

THROUGHOUT the length and breadth of the tropical belt of North Queensland, from Ingham in the north to Port Douglas and Mossman in the north, and embracing the Cardwell, Tully, Innisfail, Babinda, Gordonvale and Cairns districts, "coastal fever", as it has been designated, has presented, for the past fifteen years or more, a problem, not only to the medical profession from the point of view of classification (in other words, correct diagnosis of its true nature), but also, from the economic standpoint and from health reasons, to the workers in cane fields and scrub lands.

During practice in Tully and Cardwell districts, embracing a period of seven years, I have personally treated one thousand five hundred cases of "coastal fever". Many interesting months of practical and theoretical work have been provided in the study of this disease, and at last I consider that I am able to prove beyond a reasonable doubt that coastal fever, as occurring in Tully and Cardwell districts, is definitely endemic (tropical) typhus of the rural type in which the vector is the scrub mite.

I am prepared to go further and make the sweeping statement that, with the exception of the cases of Weil's disease in Ingham district, and possibly a few scattered cases of leptospirosis in other districts at odd times, all other cases of coastal fever in North Queensland are endemic typhus.

Lines of Investigation.

On commencing practice in Tully in July, 1928, I was confronted with several cases of coastal fever. The cases varied in severity, some patients being mildly affected whilst others became very ill and developed the "typhoid" state. This suggested to me that these cases were possibly some form of typhoid or paratyphoid fever. Accordingly I had blood cultures done, also Widal agglutination tests, with about 99% of negative results. The other 1% proved to be cases of definite typhoid and not strictly speaking in the coastal fever class. Future experience was able to show that, whereas the typhoid state in typhoid fever did not develop until the second or even the third week of the illness, these patients with coastal fever, when developing that state, did so quite early, that is, in the first five to seven days of the illness.

With the outbreak of Weil's disease in Ingham a close study of the similarity of the symptoms of that disease and those of coastal fever suggested to my mind the possibility of the latter being some form of leptospirosis. Acting upon this assumption, my next line of attack was in securing specimens of blood and urine from coastal fever patients and having them examined for leptospiræ. I also inoculated guinea-pigs with specimens of blood and, later, urine, in the hope of establishing a condition of leptospirosis in these animals, but all efforts met with a negative result and proved that these cases were not caused by leptospiræ. I might here mention that I have not yet encountered a case of Weil's disease in the Tully and Cardwell districts, but at the same time I realize that at any moment cases of this nature may occur, and I am at all times on the look-out for them.

For several months my thoughts revolved around the fact that certain forms of non-epidemic or endemic typhus resemble coastal fever very closely, and upon receiving negative results from my typhoid, parathyphoid and leptospirosis investigations I came to the conclusion that these cases of coastal fever were in themselves possibly cases of endemic tropical typhus. This decision I came to in April, 1935, when an outbreak of coastal fever of a severer type than usual occurred in the Tully district.

It was at this stage that I received valuable assistance and suggestions from the State Department of Health in Queensland, which has at all times displayed a keen interest in this coastal fever problem, as in all other matters appertaining to the health of the community; also from Dr. R. Mathew, Medical Officer in Charge of the Commonwealth Health Laboratory, Cairns.

Eight patients with coastal fever of a severe grade were now admitted to the Tully District Hospital. Specimens of blood were taken from these patients and a Weil-Felix test was performed on each specimen. Seven of these patients were at the time of taking the specimens in about the fourth or fifth day of their illness, and in each of these tests no agglutination occurred. Fortunately the eighth patient happened to be in the eighth day of his illness, and with his serum agglutination occurred with Kingsbury strain of *Bacillus proteus* to a titre of 1 in 80. This was very suggestive, though not conclusive, of an endemic typhus infection. Accordingly I determined to repeat the tests in all eight cases, and in doing so found that all eight specimens, when taken after the tenth day of the illness, produced agglutination with Kingsbury strain of *Bacillus proteus* ranging in titre from 1 in 320 to 1 in 2,560. Agglutination with a titre of 1 in 100 is regarded by Megaw as almost diagnostic of typhus, and as my lowest agglutinating titre was 1 in 320 it proved conclusively that these cases were endemic typhus. Since these eight cases occurred other patients with milder infections, exactly similar in every detail to the usual coastal fever cases of the past seven years, have been admitted to the Tully District Hospital and have shown a positive agglutination to Kingsbury strain of *Bacillus proteus*, the titre varying from 1 in 320 to 1 in 640. All cases in Tully to date have failed to yield agglutination with the Warsaw strain of *Bacillus proteus*.

In view of the results of my investigations, coupled with the experience of 1,500 cases, I do not consider my statement too sweeping when I say that nearly all cases of coastal fever in North Queensland are endemic tropical typhus.

Occupation of Patients.

Practically the whole of my series of 1,500 patients have been engaged in cane-cutting, timber-getting, in scrub-falling, in casual work in the cane fields, or have been otherwise employed in work bringing them into contact with the scrub. We have had marked evidence of this recently when an outbreak of coastal fever occurred among the workers employed at El Arish and Clum Point, building a new road through tropical scrub.

The Vector.

On close examination of many cases I have been able in several instances to find definite signs of an insect bite, with its black central eschar and surrounding red areola.

The occupation factor, coupled with the evidence of the insect bite and the agglutination to Kingsbury strain (XK) and not to the Warsaw strain of *Bacillus proteus*, together with certain significant symptoms and signs which I shall enumerate and dilate upon later in this paper, points to the vector being a mite.

Therefore these cases of coastal fever are, in my opinion, none other than endemic tropical typhus of the rural type, in which the vector is a mite, that is to say, they are cases of mite typhus.

Preventive Measures.

No doubt the rats and mice of the cane fields and scrub constitute the reservoir of infection, and attempts to stamp out the disease would entail a campaign of destruction against these rodents.

Early and proper treatment of the mite bite would probably also lessen the incidence of cases.

As far as I have been able to observe, the disease is not communicable from man to man, but apparently from animal to man, per medium of the mite. This places these cases of typhus in the endemic or non-epidemic group.

Immunity.

An attack of coastal fever does not appear to confer any marked degree, if any, of immunity, as many patients have had two or even three attacks in my years of residence in the Tully and Cardwell area, although subsequent attacks in several cases have been of a milder nature.

Clinical Features.

Age.—The disease occurs in children as well as adults, but in the former as a rule is of a much milder type. In adults I have found that patients over thirty-five years of age generally experience a severer type of infection than younger men. Women are very seldom affected with the disease, and this tends to be in keeping with my contention as to the ætiology of the disease. The disease varies considerably in different outbreaks and in different individuals in the same outbreak, but they all have certain fundamental symptoms and signs that differ in degree only.

Occupation.—The occupations of persons affected have been already dealt with in the paper.

Onset.—The onset is as a rule sudden, with severe frontal headache, chilly sensations or actual rigors, aches and pains all over the limbs, and particularly in the lower lumbar or lumbo-sacral region and often up the back of the neck. The temperature is usually from 37·8° C. (100° F.) to 38·3° C. (101° F.).

Early Symptoms and Signs.—In the majority of cases the temperature a few days after the onset rises rapidly to 38·9° C. (102° F.) and even to 40° C. (104° F.). The face becomes flushed and later suffused. The conjunctivæ become markedly injected, eyeballs become tender, and in many cases photophobia is complained of. A peculiar odour emanates from the body of the patient, and I have often been able to refer to the fact that "the patient smells of coastal fever". There is lymphadenitis of the glands of the groin and the axillæ, and occasionally of the neck, the enlarged glands being particularly marked in those areas draining the mite bite. This lymphadenitis usually appears on about the third or fourth day.

A rash is variable, but if looked for carefully can be found in at least 70% of cases. The rash usually makes its appearance about the fourth or fifth day.

Another peculiar subjective symptom that I have found in many of these cases is a very definite hyperæsthesia of the scalp and forehead. The patient is at this stage dull, apathetic and drowsy, and prostration is pronounced. Many of these patients complain of a sore throat and display an injected and reddened pharynx. A cough is sometimes present and troublesome.

Symptoms at the Height of Fever.—The headache persists and is troublesome. We also find general malaise and the rash is well marked. However, it is on the nervous system that the full force of the attack seems to concentrate at this stage. The patient now becomes restless, suffers from insomnia and, in severe cases and if the patient is old, the typhoid state develops with its well marked delirium and train of nervous symptoms.

The Rash.—The rash usually appears on the fourth or fifth day, and at first consists of rose-coloured papules which fade on pressure. The rash rapidly becomes macular and darker in appearance, and often resembles measles, and in many cases does not now fade on pressure. In the severer grades of infection petechiæ may be seen and the rash becomes nodular. The rash usually appears on the chest wall, both back and front, and also on the abdomen. In severer cases it extends to the face, forehead and extremities. In mild cases it appears only as a faint mottling of the skin of the chest wall and abdomen, and often can be noticed only on close scrutiny, being quite easy to miss. In about 25% of cases (usually very mild) no rash appears.

Temperature Chart.—The temperature chart appears to vary according to the severity of the attack. In most cases it is 37·8° C. (100° F.) or thereabouts at the onset. It rapidly rises to from 38·9° C. (102° F.) to 40° C. (104° F.) and remains as a continued fever for about four days; then remissions occur daily. The fever usually lasts for from eleven to sixteen days and falls by rapid lysis. Occasionally the fall is more gradual. In other cases I have noticed that the fever has early been of the step-ladder type, without the early rapid rise. Then again I have encountered the milder or abortive type in which the fever has lasted only five to seven days.

Circulatory System.—At the onset of the disease the pulse is usually rapid, to fall later to a rate that is slow in comparison with the height of the temperature. When the temperature is in the vicinity of from 38·9° to 40° C. (102° to 104° F.) the pulse rate is usually between 80 and 96. The volume and tension remain good in a large majority of cases, but in the severe forms of the disease the blood pressure becomes low during the final four or five days that the fever is at its height, and signs of heart failure have frequently become manifest, calling for cardiac therapy.

Gastro-Intestinal System.—Early the tongue is moist and coated with a heavy fur; later it becomes drier, and in severe cases quite dry and brown. The pharynx is in some cases injected and reddened. Sordes tend to develop on the teeth and lips, and frequent care of these parts is called for. Constipation is the rule, diarrhœa being rare. Vomiting and epigastric pain occur in 10% of cases. No patients have shown enlargement of the liver, and jaundice has been absent from all my cases. Enlargement of

the spleen has been very rare in my series of cases, occurring in about 2%.

Kidneys.—Febrile albuminuria is relatively common and quickly clears up of its own accord. No true cases of nephritis have occurred.

Glands.—Lymphadenitis has been a constant feature, occurring in fully 80% of cases. The enlargement is usually in the axillæ and groins, sometimes in the neck. The glands vary in size from that of a pea to a walnut, the latter being more common. The glands are not acutely inflamed nor very tender, and in many cases the patient does not complain of them.

Lungs.—The lungs are not involved in the majority of cases. About 5% of my series developed bronchitis in varying degrees. Bronchopneumonia and lobar pneumonia as complications have been extremely rare.

Nervous System.—The nervous system, as previously mentioned, is particularly affected, especially in severe grades of the disease. Early there is dulness, apathy, drowsiness and prostration, to be followed by restlessness and insomnia, whilst the patient, if very ill, will develop delirium and pass into "the typhoid state". Some patients have complained of absent-mindedness and forgetfulness for some time after an attack.

Convalescence.—Convalescence is usually rapid. The appetite returns quickly and most patients are fit for work again, and actually anxious to do so, in from one to two weeks after discharge from hospital. Loss of weight is rapid during the illness.

Diagnosis.

The history of rapid onset with rigors, aches and pains, the peculiar odour emanating from the patient, the flushed appearance of the face with congested conjunctivæ, the typical temperature chart and rash form a definite clinical picture. Lymphadenitis is early apparent, and the mite bite is often found by careful search. The Weil-Felix test does not give a positive reaction until at least the eighth and usually the tenth day.

Prognosis.

The prognosis is good and death from the disease has been rare. A few patients recently died in the Cairns and Mossman districts.

Treatment.

Good nursing and symptomatic treatment form the keynote of treatment. Diet should be light and nourishing. Special care of the tongue, teeth and mouth is necessary. Enemata given every other day seem to distress the patient much less than aperients. Hydrotherapy in the form of reduction sponges is much preferable to drugs. For the headache and aches and pains I generally prescribe "Tabloid Empirin compound" with Dover's powder. For the insomnia and restlessness I order bromide and ammoniated tincture of valerian or "Hebral sodium" or suchlike preparations with excellent effect.

Case Reports.

The following series includes eight typical cases, some of which I regarded as being mild, whilst others were of a severe type.

CASE I.—L.B., a male patient, aged twenty-six years, a cane-cutter, became ill suddenly, with chilly sensations, frontal headache, aches and pains in the lower extremity, and particularly in the lumbar region. His temperature on admission to hospital one day later was 37·6° C. (99·8° F.), his pulse rate was 104. His eyes became congested next day and lymph glands in axillæ and groins became enlarged on the third day of the illness. A rash appeared on the fifth day on the chest and trunk as faint rose-red papules. The papules did not increase in size nor did the rash spread over any other part of the body. The patient was at first drowsy and listless, but about the sixth day became slightly restless and complained of insomnia, but no delirium appeared. The temperature rose rapidly in the first two days to 38·9° C. (102° F.) and remained around 38·9° and 39·4° C. (102° and 103° F.) for three days, then daily remissions of about 1° C. began to occur and the temperature dropped to normal by rapid lysis on the eleventh day of the disease. No splenic enlargement occurred. The Weil-Felix test and the Widal test on the sixth day of the illness gave no reaction. The Weil-Felix test on the tenth day gave a positive reaction to Kingsbury strain of *Bacillus proteus* with a titre of 1 in 640; no reaction was given with the Warsaw strain. No insect bite was detected. Convalescence was rapid. The patient was back at work one week after discharge from hospital.

CASE II.—G.G., a male, aged forty-five years, was a road-builder in the scrub. The onset of his illness was sudden; he had rigors, aches and pains in the back and limbs, severe frontal headaches, anorexia and general malaise. He was admitted to hospital on the fourth day of the illness with a temperature of 38·9° C. (102° F.) and a pulse rate of 90. The conjunctivæ were congested, the glands in the axillæ and groin were enlarged. The patient was drowsy, apathetic and prostrated. A rash appeared in the fifth day of illness as rose papules and rapidly became darker and measly in appearance. The rash was nodular by the eighth day of the illness, and small petechiæ appeared. The rash appeared on the chest and abdomen and extended to both extremities, face and forehead; no rash appeared on the palms or soles. The temperature ranged between 38·9° and 39·7° C. (102° and 103·6° F.), with remissions, and fell by rapid lysis on the twelfth day; later there was an evening rise to 37·2° to 37·5° C. (99° to 99·6° F.) for four days, after which it remained normal. Febrile albuminuria was present. This patient had pronounced nervous symptoms, restlessness and delirium, and developed "the typhoid state". He became very ill and it appeared as though he was going to die. Hyperæsthesia of the scalp and forehead was present. No splenic enlargement occurred. An insect bite with an eschar was found on his right thigh. The patient was very weak for about five days after getting out of bed. His appetite returned rapidly and he commenced work two weeks after discharge from hospital. The Weil-Felix test on the eighth day of illness gave a positive reaction (1 in 80) with the Kingsbury strain, but no reaction with the Warsaw strain. The Weil-Felix test on the sixteenth day of illness gave a positive reaction (1 in 2,560) with the Kingsbury strain, but no reaction with the Warsaw strain. The Widal test gave no reaction.

CASE III.—B.R., a male patient, aged twenty-six years, was a timber-getter. The onset of his illness was sudden. He had frontal headache, rigors and aches and pains in the limbs and back. He was admitted to hospital on the third day of illness with a temperature of 39·4° C. (103° F.) and a pulse rate of 100. The conjunctivæ were injected. Fever odour was apparent. The glands were slightly enlarged in the axillæ and later became the size of a walnut in the axillæ and the groin. A rash appeared on the fifth day of the illness and changed in two days

from rose papular to deep red macular, and in another day it became definitely nodular. It appeared first on the chest and then extended to the abdomen, extremities, face and forehead. The cough was troublesome and subacute bronchitis was present. Dulness and prostration were pronounced, insomnia was present, and when the patient did sleep he was disturbed by nightmare. The temperature fell to normal by gradual lysis on the seventeenth day of illness. Febrile albuminuria was present. The spleen was definitely enlarged. The liver was not enlarged; no jaundice was present. Hyperæsthesia of the scalp was present. The Weil-Felix test on the twelfth day of the illness gave no reaction. On the sixteenth day of the illness a positive reaction (1 in 320) was obtained with Kingsbury strain, but no reaction with the Warsaw strain. The Widal test gave no reaction. No bite was detected. Convalescence was slow; the patient was unable to work for three weeks after discharge from hospital.

CASE IV.—E.J., a male patient, forty years of age, was a road-maker working in scrub. The onset of his illness was gradual, with two days of malaise and anorexia. Then chilly sensations were noted and vague aches and pains in the back and limbs were present with frontal headache. The patient was admitted to hospital on the fourth day of illness with a temperature of 38·3° C. (101° F.) and a pulse rate of 86. The next day the temperature was 39·4° C. (103° F.). The temperature continued about 38·9° to 39·4° C. (102° to 103° F.) for four days and fell by rapid lysis on the eleventh day of the illness. The glands were enlarged in the axillæ and groin. The conjunctivæ were injected. A rash appeared on the fifth day as faint rose papules and was never at any time very distinct, appearing on the chest and abdomen. Nervous symptoms were not marked, slight insomnia was present, there was no splenic enlargement. A bite was detected on the left thigh. The Weil-Felix test on the seventh day of the illness gave no reaction. On the thirteenth day of the illness a positive reaction (1 in 640) was obtained with the Kingsbury strain but not with the Warsaw strain. The Widal test gave no reaction. Convalescence was rapid; the patient was working four days after discharge from hospital.

CASE V.—P.M., a male, aged thirty-six years, was a road-maker in the scrub. The onset of his illness was sudden, with rigors, frontal headache, aches and pains in the limbs and back. He was admitted to hospital on the second day of his illness with a temperature of 37·8° C. (100° F.) and a pulse rate of 90. The conjunctivæ became congested and glands became enlarged in the axillæ and groin on the fourth day. A rash appeared on the fifth day; it was rose papular and became rapidly red macular and later nodular; it appeared on the chest and abdomen, limbs and face. Hyperæsthesia was present on the scalp. His temperature was 39·4° C. (103° F.) two days after his admission and ranged from 38·9° to 40° C. (102° to 104° F.), falling by rapid lysis on the fifteenth day of illness. Nervous symptoms were very marked, and the patient developed the typhoid state. There was a definite odour of fever on the body. No splenic enlargement occurred. A bite was detected on the left pectoral region. Enlarged glands were present in the left axilla, smaller glands were palpable in the right axilla and groin.

The Weil-Felix test was not done on this patient, as I was absent from the district, but on my return I was able to secure a specimen of blood one month after the patient's discharge from hospital and a positive reaction was obtained to Kingsbury strain to a titre of 1 in 640. A Widal test performed whilst the patient was in hospital gave no reaction.

CASE VI.—E.M., a male, aged nineteen years, was a timber-getter. The onset of illness was gradual, with two days' malaise, vague aches and pains in the limbs and back, a chilly sensation, frontal headache. He was admitted to hospital on the third day with a temperature of 37·8° C. (100° F.). The temperature rose in step-ladder fashion to 40° C. (104° F.) on the fourth day after his admission. Then after daily remissions it fell by rapid lysis on the fifteenth day of illness. Photophobia was present, also febrile albuminuria. A rash appeared on the sixth day—faint rose papules with a mottled appearance on the chest and abdomen. Nervous symptoms were mostly shown by dulness and apathy. No bite was detected. No splenic enlargement was present. The Weil-Felix test on the twelfth day of illness gave no reaction. The Weil-Felix test on the twentieth day gave a positive reaction (1 in 320) to Kingsbury strain and no reaction to the Warsaw strain. The Widal test gave no reaction. Convalescence was rapid; the patient was back at work in five days from his discharge from hospital.

CASE VII.—T.Q., a male, aged fifty-six years, was a road-maker in the scrub. The onset of illness was sudden, with headache, chills, aches and pains in the limbs and back. The conjunctivæ were injected on the second day of illness. The temperature was 37·8° C. (100° F.) and the pulse rate was 98. The temperature rose rapidly to 39·4° C. (103° F.) in two days and continued without remissions for another three days, then began to remit daily and fell on the eleventh day of illness by rapid lysis. Enlarged glands appeared on the fifth day and a rash on the same day. Pale rose papules were present, which did not extend beyond the chest and abdomen. Nervous symptoms were marked. The patient was drowsy and dull at first, then later restless, and had marked insomnia. No bite was detected. No splenic enlargement occurred. Smell of fever was marked. Febrile albuminuria was present. The Weil-Felix test on the seventh day gave no reaction. On the fourteenth day a positive reaction (1 in 1,280) was obtained with Kingsbury strain; no reaction occurred with the Warsaw strain. The Widal test gave no reaction. Convalescence was rapid; the patient was back at work in six days after his discharge from hospital.

CASE VIII.—J.F., a male, aged thirty-two years, was a road-maker in the scrub. The onset of disease was gradual, with two days' malaise, chills, aches and pains and headache. The temperature, which was 37·5° C. (99·6° F.), rose rapidly in the next two days to 38·9° C. (102° F.) and rapid lysis occurred at the twelfth day. Drowsiness and apathy occurred with slight insomnia later. A rash appeared on the fifth day, very hard to discern, as it occurred only as a faint mottling on the chest and abdomen. Glands were palpable in the axillæ only. Hyperæsthesia of the scalp was marked. No splenic enlargement occurred. Odour of fever was present. A mite bite was found on the anterior aspect of the left axilla. The Weil-Felix test on the seventh day of illness gave no reaction. On the twelfth day of illness a positive reaction (1 in 640) was obtained with Kingsbury strain; no reaction occurred with the Warsaw strain. The Widal test gave no reaction. Convalescence was rapid—the patient was back at work five days after his discharge from hospital.

Conclusions.

It would thus seem that in North Queensland we have coastal fever which can be classified into cases of: (i) Weil's disease, (ii) possibly other forms of leptospirosis, (iii) endemic tropical typhus.

The last group forms by far the major portion of these coastal fevers. Of course, we come into contact with typhoid and paratyphoid fevers, which of themselves are not peculiar to this coastal belt alone. A paper such as this must of necessity entail a good measure of repetition, and on this point I crave the reader's indulgence. I trust that this paper will further serve to stimulate interest and research in our problem of tropical diseases in Australia.

Acknowledgements.

I am indebted to the Department of Health in Brisbane for valuable suggestions and the interest displayed in these cases of coastal fever. To Dr. R. Mathew, of the Cairns Commonwealth Health Laboratory, I offer my sincere thanks for his

valuable assistance in doing the different laboratory tests necessary. He was at all times ever ready to assist and expedite matters. To Professor Harvey Sutton and Dr. Baldwin, of the School of Public Health and Tropical Medicine, Sydney, and all other members of the recent medical conference in the north who were responsible by their own display of enthusiasm in stimulating investigation of our tropical medical problems here in North Queensland, I am also indebted.

Post-Scriptum.

Since this paper was written a death has occurred in the Tully District Hospital. A male patient from the outbreak in the Church Point area died on the tenth day of his illness. A Weil-Felix test carried out shortly before death gave a positive result to Kingsbury strain of *Bacillus proteus* to a titre of 1 in 640. The patient gave the typical signs and symptoms of endemic typhus as described in other cases.

SOME POINTS IN THE TREATMENT OF APPENDICITIS.[1]

By ALFRED J. TRINCA, M.D., F.R.C.S. (England),
Honorary Surgeon to In-Patients, Alfred Hospital; Consultant Pathologist to the Baker Institute of Medical Research.

The Time to Operate.

DURING recent years there has been a revival of the expectant treatment of appendicitis in an endeavour to lower the mortality, and the young practitioner is often faced with the problem of when to operate.

We can divide cases when first seen into four groups: 1. Early and with signs of general peritonitis. 2. Early and showing signs of subsiding. 3. Cases seen usually after forty-eight hours or more from the onset, which show a localized peritonitis or abscess. 4. Late cases with general peritonitis.

Group 1.—While there are a few practitioners who will treat any case of acute appendicitis by expectant treatment until acute symptoms subside or serious complications develop, the majority will treat Group 1 by immediate operation.

Group 2.—If, when the patient is first seen, there is definite evidence of subsidence the condition can be allowed to subside and operation can be performed at the surgeon's leisure or in an *interim* period. But if a patient has been put to the inconvenience of admission to hospital why not operate during this particular sojourn?

In the early stages of appendicitis, that is, in both Groups 1 and 2, the clinical picture is not necessarily a scientific criterion of the pathological state of the appendix, and no one can foretell with any degree of certainty what is to be the outcome. Rapid gangrene of the appendix may be coincident with disappearance of pain and apparent improvement in general condition. In children the process tends to be more rapid than in adults and peritonitis is more common. After forty-five years of age not only is the incidence of peritonitis high, but the symytoms of this complication may be unrecognizable until paralytic ileus occurs. Further, in pelvic appendicitis, the most treacherous form, the clinical picture may be equivocal until the signs of peritonitis appear. The division therefore of early cases into these two groups is in some cases artificial. For these reasons I can see no valid argument in favour of delay or against immediate operation.

Group 3.—In Group 3 the surgeon has the choice of either immediate operation or expectant treatment. No one can predict the future of a localized peritonitis. An appendiceal abscess in favourable cases may subside; it may burst into the bowel and be discharged *per rectum*, it may burst and produce a general peritonitis, it may produce a subphrenic abscess. Mortality statistics suggest that operation is particularly dangerous between the third and fifth days inclusive, during a period when natural immunity is supposed to be exhausted, acquired immunity has not been established and the patient is in a negative phase. This negative phase is purely theoretical and has not been proved scientifically. I am inclined to look on it as a myth and to ascribe the high mortality to other causes, such as rough handling, ill-advised attempts to carry out a difficult removal, breaking down of the abscess wall, and the spread of infection; and I maintain that with the gentle and skilful surgeon the mortality will not be influenced to any extent by this so-called dangerous period. The longer one waits, the more difficult it is to remove the appendix, the ideal treatment, which is more likely of attainment in an early case, and provided one is a skilful operator I can see no argument in favour of delay.

Group 4.—Group 4 is that in which the mortality is highest,[2] and statistics show that with the Ochsner-Sherren treatment[1] there has been a remarkable lowering of the death rate. The lesson that I have personally learnt from the Ochsner-Sherren treatment is that in a case of advanced general peritonitis one can afford to wait long enough to improve a patient's condition by injections of saline solution, rest and other methods before undertaking operation. It is my practice to operate on all cases of general peritonitis whilst the peritonitis is still general, and not to wait for a problematical localization, relying on rapid operations, the minimum surgical procedure and the correct anæsthetic to tide the patient over his difficulties.

To these another group could be added, and this would include all cases of appendicitis, irrespective of the duration of symptoms, in which a purgative has been given. Aggravation of the pathological condition and/or perforation are regarded as almost a *sine qua non* after the administration of a purgative, and immediate operation should be performed.

[1] Read at a meeting of the Victorian Branch of the British Medical Association on June 15, 1935. The first part of the paper read by Dr. Trinca was a repetition of one delivered before the Royal Australasian College of Surgeons at its meeting in March, 1935, and its publication has been arranged in *The Australian and New Zealand Journal of Surgery*. The full title of Dr. Trinca's paper was: "The Ætiology of Appendicitis and Some Points in Treatment".

Management of Cases of Acute Appendicitis.

Pre-Operative Treatment.

A purgative or enema should not be given. If the patient is in great pain, as in the obstructive type of appendicitis, a preliminary dose of morphine should be given.

Anæsthetic.

Any patient showing signs of peritonitis should be given the benefit of gas and oxygen anæsthesia, and for late cases in which a simple quick operative procedure, such as the introduction of a tube without any attempt to remove the appendix, is contemplated, local anæsthesia should be used.

I do not believe in spinal anæsthesia because of its effect in lowering the blood pressure, particularly in male subjects.

Operative Procedures.

All cases of appendicitis, particularly the late cases, should be treated with gentleness in handling, the minimum use of retractors and packs and the avoidance as much as possible of handling or even viewing coils of intestine.

The Incision.—I favour McBurney's incision whenever possible, and this incision should be made near the antero-superior iliac spine so as to avoid opening on to the sheath of the rectus. It is a common mistake to make the incision too far medially. In opening the aponeurosis of the external oblique muscle it is wise not to extend the split too far upwards, because splitting the muscular portion of the structure is often attended by troublesome hæmorrhage. Care should be taken in splitting the internal oblique and transversalis muscles not to damage any nerve to the rectus muscle, or the ileo-inguinal nerve, as right inguinal hernia follows a certain percentage of muscle-splitting operations and has been proved[4] to be caused by damage to the ileo-inguinal nerve. Unnecessary opening up of tissue planes by blunt dissection and undue traction on separated muscles should be avoided, because it opens up space for the accumulation of blood or spreading infection. The opening should be large enough to allow of visualization of the appendiceal area, and greater access can be obtained, where necessary, by a transverse incision in the rectus sheath and retraction of the rectus muscle inwards.

Opening the Peritoneum.—Difficulty is sometimes experienced in opening the peritoneum, and this is sometimes due to the fact that the transversalis fascia has not been divided. The peritoneum should be grasped with forceps and then palpated between the fingers and drawn on until it appears like an empty hernial sac. It should then be opened with blunt-pointed scissors, which are safer than the knife.

Delivery of the Appendix.—If the appendix cannot be easily delivered by the inserted finger, the delivery of portion of the caecum proximal to the appendix will often help and sometimes pull the appendix out with it. In most cases traction on the caecum will reveal the base of the appendix, and in the case of a fixed appendix this can be divided, the caecum can be lightly packed upwards and the appendix more easily dealt with. To avoid contamination of the wound it is advisable to wrap the appendix when delivered in a gauze pack. A valuable procedure for the removal of an appendix which is tied down or which is incorporated in the wall of the caecum is that introduced by the late Dr. Hamilton Russell, namely, the subperitoneal removal of the appendix by means of a longitudinal incision along its antimesenteric border; the appendix, after being divided at its base, can then be more or less easily peeled out with a surprising lack of hæmorrhage. If the peritoneal bed is gangrenous it should now be removed.

Treatment of the Stump.—Some surgeons recommend in all cases simple ligature with the application of the cautery or an antiseptic and no purse string.[5] I can see no reason for not completing the toilet of the peritoneum as one does in intestinal suture generally, and, where possible, I bury the stump with a purse string suture. The procedure takes very little time and the risk of adhesion is greatly lessened. The abolition of the purse string has been advised on the grounds that it is unnecessary, that it is time-consuming, that it is attended by danger of perforation of the bowel and the production of hæmorrhage, and that it may result in a residual abscess in the wall of the caecum. My criticism is that the purse string suture is not time-consuming, and that the risks of perforating the bowel or of producing hæmorrhage do not occur in the hands of any surgeon who understands simple intestinal surgical technique. With regard to the production of a residual wall abscess, I cannot see how this can occur. The appendiceal stump, after application of the purse string suture, is inverted into the lumen of the caecum and is comparable with the sutured edges in a gastro-enterostomy. Why not complete the toilet of the peritoneum as in intestinal suture generally? And may not success with just a simple ligation of the appendiceal stump and abolition of the purse string suture lead to carelessness in operations other than appendicectomy? If the wall of the caecum is thickened by inflammation, or if it is felt that burying the stump will deform the ileo-caecal valve, or where an operation is one of great urgency, I dispense with this procedure. I use 5% formalin as an application to the stump of the appendix rather than pure carbolic acid, because of the risk of sloughing with the latter.

Ligatures.—It is my practice not to use silk, particularly in the presence of sepsis. I use plain catgut to ligature the meso-appendix and base of the appendix, and fine chromicized catgut for the purse string suture.

A difficulty sometimes met with is hæmorrhage from a fat or œdematous mesentery, due to the ligature tearing through this structure. This is less likely to occur with thick catgut. It is often a matter of great difficulty to control this hæmor-

rhage, and if securing and ligation of the bleeding points be unsuccessful, or take too long, it is better, in the interests of the patient, to stop this hæmorrhage with a lightly applied gauze pack, which can with safety be removed in twenty-four hours.

The subperitoneal appendix may give great difficulty in removal, and after removal leave a raw bleeding surface, denuded of peritoneum. It is safer to put a gauze pack in this bed before closure, on account of the risk of hæmorrhage and of the introduction of sepsis into the retroperitoneal space.

Treatment of Appendiceal Abscess.

It may be necessary to modify the position of the incision used in the ordinary muscle-splitting operation, although this will suffice for the majority. The incision should be placed, if possible, just lateral to the abscess, so as to avoid contact with coils of small intestine. No matter what the duration of the abscess, the operative procedure should be quick and minimal. It is not a disgrace to leave part or whole of the appendix behind, and if removal of a gangrenous appendix means the breaking down of protective adhesions or a profuse hæmorrhage, it would be better if the patient had not been operated upon. Sometimes the appendix itself cannot be removed, but the base is easily accessible. This should be divided and the rest of the appendix should be left.

Most cases of appendiceal abscess need drainage, but occasionally the wall of an abscess cavity is mainly composed of thickened omentum, and this can be removed with the appendix and the case treated without drainage.

One advantage in operating early in appendiceal abscess is that at times after removing the appendix one can see that the cavity left behind is comparatively clean, showing no signs of sloughing, and is in fact only granulation tissue. Provided the appendix has been completely removed and there is a certainty that no fæcolith has been left behind, such abdomens can also be closed without drainage.

The Drainage Material.—The object of drainage of an appendiceal abscess is to make a track of least resistance and so to direct to the surface any infective material left in the abscess cavity, or any which may accumulate therein. This is usually accomplished in thirty-six hours. Tubes should be of the softest rubber or of rubber dam, and should be so placed that they do not touch coils of small intestine. It is often advisable to insert the tube through a separate stab wound lateral to the incision. A tube should never be tightly held in position by sutures, as this will cause sloughing of the abdominal wall.

Subsequent Removal of the Appendix.—Subsequent removal of the appendix should be always advised, but not too soon. It takes some weeks for the healing of granulation tissue in the cavity and the lessening in vascularity of newly formed adhesions.

Operation at too early a period after drainage is dangerous and may be attended by fatal hæmorrhage. My practice is to wait at least three months.

Suture of the Wound.

When no drainage has been used the peritoneum should be closed in such a way as to evert the edges in order to prevent formation of adhesions. Care must be taken not to include between the edges a piece of bowel or omentum. The internal oblique and transversalis should be sutured by the application of superficial sutures that include only the fascia over them. Deep sutures strangle the muscle and possibly a motor nerve.

When drainage has been used it is inevitable that some degree of wound sepsis will occur, and it is advisable in such cases to suture only the peritoneum around the tube, with perhaps one or two silkworm gut sutures through the skin and aponeurosis of the external oblique muscle. In a late abscess no sutures should be placed through the parietes at all.

Prevention of wound sepsis in undrained cases is often a difficult problem when a gangrenous appendix is being removed. The use of skin packs and the prevention of any contact of the appendix with the wound will help to some extent, but will not prevent infection in all cases, and it has been increasingly my practice in recent times to introduce through the layers of the abdominal wall to the closed peritoneum a small piece of rubber dam which is removed in twenty-four hours. In this connexion hæmostasis of the wound is most important. A hæmatoma is almost certain to become infected.

The Danger of Skin and Towel Clips.

It has always seemed to me unnecessary trauma in clean surgical operations and a source of danger in infected cases to penetrate the skin to hold towels or skin packs in position. Last year in the Alfred Hospital there were two cases of gas gangrene of the abdominal wall, one of them fatal, produced by infection through punctures made by towel clips in two cases of appendiceal abscess. Gas gangrene did not occur in the edges of the loosely sutured operation wound, but commenced some distance from the wound, in one case in a towel clip puncture five or six inches away from the wound. Infection had been carried into an anaerobic area by the towel clip.

Treatment of Peritonitis.

I am not going to labour the point of non-drainage when the appendix has been completely removed. I am more than ever convinced of the wisdom of the procedure. My views are well known in this respect.[6] I would, however, stress the advisability of leaving *in situ* peritoneal exudate which is not contaminated by appendiceal *débris* or fæcoliths. This fluid is not harmful; its removal causes unnecessary trauma and is followed by an immediate reaccumulation of exudate, as the peritoneum has not recovered from its toxic spoiling, and a serious dehydration results.

In the Ochsner-Sherren treatment of advanced general peritonitis expectant treatment is advised, because in many cases absorption of most of this fluid occurs without detriment to the patient.[3] Another lesson to be learnt from the Ochsner-Sherren treatment is that, as the peritoneal exudate can be absorbed, there is no need to remove it. It adds further argument to my contention.

Paralytic Ileus.

Paralytic ileus, whether produced by unskilful operating or by the peritonitis itself, should be treated by strict expectant treatment. The treatment can be summed up in the words: "Do as little as possible, give no fluid by the mouth, give no purgatives in any circumstances, give no intestinal stimulants". Morphine can be given in sufficient quantity to promote mental calm and sleep, but not as a routine drug at stated intervals. Morphine does not promote intestinal rest; it has recently been proved to stimulate intestinal peristalsis. Dehydration must be prevented by saline solution given by any convenient route.

I have not attempted in this short paper to give a complete or systematic account of the treatment of appendicitis, but to give some personal views which I recognize are debatable but which I hope may be instructive.

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THERAPEUTIC ABORTION: A REVIEW OF SOME CASES.[1]

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IN no way does the writer pretend in the paper presented tonight to deal with a complete list of diseases for which termination of pregnancy may be justifiable or necessary. Its scope has been restricted to diseases for which induction of abortion has been performed during the time the writer has been in charge of the obstetric ward at the Ballarat Hospital. The paper is not presented in the hope that any information contained therein will be of much profit to those listening, but as a means to provoke discussion which will be helpful and instructive to all.

[1] Read at a meeting of the Victorian Branch of the British Medical Association on June 15, 1935.

Renal Disease.

The most frequent cause of intervention in this series of cases has been the repetition of pregnancy accompanied by renal disease. The view is taken that: (i) pregnancy complicated by chronic nephritis has very little chance of reaching a successful conclusion; (ii) with each succeeding pregnancy the amount of residual damage in the kidneys is increased. The value of a mother and wife has to be weighed against the life of a fœtus which has a small chance of reaching the stage of an independent existence.

In this series of cases most of the patients had, as a result of a series of toxæmic pregnancies, been warned to avoid becoming pregnant, but in spite of that advice were again in the same condition. These patients were advised to have their pregnancies terminated and to undergo sterilization in view of there being no prospect of a change in their condition. The histories of these cases are as follow:

Mrs. C., aged thirty-four years, was admitted to the Ballarat Hospital on November 13, 1934. She stated that she had been well until one week before, when she began to sleep badly, became dyspnœic and giddy. Her last normal menstrual period had been on May 4, 1934.

She had had four previous pregnancies, all terminating in abortion, in three cases at three months and one at five months. Each pregnancy had been complicated by albuminuria. On examination she was found to be twenty-four weeks pregnant. The systolic blood pressure was 180 millimetres of mercury. The urine had a specific gravity of 1008, contained much albumin (one-third) and blood.

After four days of eliminative treatment there was no improvement and the fluid output was definitely less than the intake. Termination of the pregnancy was advised.

On November 17, 1934, under ethylene and oxygen anæsthesia, abdominal hysterotomy was performed and the uterine contents were evacuated. Two and a half centimetres (one inch) of the centre of each Fallopian tube were resected and the ends were buried. Convalescence was uneventful.

Mrs. T., aged twenty-four years, was first seen on January 7, 1934, complaining of vomiting, lumbo-sacral pain, loss of weight, headaches and giddiness. She stated that she had not been well since her last confinement. She had nocturnal frequency of micturition and polyuria.

The first pregnancy terminated five years before in eclampsia (number of fits, eight), the second, three years before, in a still birth at eight months. Albuminuria was present. The third pregnancy was terminated at three months, as it followed the previous one too closely to allow the kidneys to recuperate. The fourth, one year previously, resulted in the premature birth of a living child, which survived. On examination the patient was found to be ten weeks pregnant, and the urine contained more than a trace of albumin. Induction was agreed to and sterilization was recommended.

On January 14, 1934, the uterus was emptied by abdominal hysterotomy under ether anæsthesia induced by the open method, and 2·5 centimetres (one inch) of each tube were resected as before. Convalescence was uneventful.

Mrs. S., aged thirty-five years, was admitted to hospital on March 10, 1935. She was then three months pregnant, the systolic blood pressure was 148 and the diastolic pressure 92 millimetres of mercury. The urine contained a trace of albumin. The blood urea was 26 milligrammes per 100 cubic centimetres, and the urea concentration tests showed 2% and 3·4% of urea at the end of the second and third hours respectively.

There had been two previous pregnancies, each with renal failure. The patient was regarded as having chronic

nephritis, and termination of the pregnancy was advised. As she had become pregnant again in spite of advice to the contrary, sterilization was recommended. On March 25, 1935, under ether anæsthesia induced by the open method, abdominal hysterotomy was performed, together with double partial salpingectomy, the peripheral ends of the tubes being buried. Recovery was uninterrupted.

Mrs. R., aged thirty-six years, was first seen on May 1, 1930, when she stated that she thought she was pregnant, as her last normal menstrual period had been six weeks before. She complained of headache and blurring of vision.

The first pregnancy was terminated prematurely for renal disease, and the second at thirty weeks for severe renal failure.

On examination the systolic blood pressure was 210 and the diastolic pressure 120 millimetres of mercury. The *fundus oculi* showed silver wire arteries and nipping of the veins. She was thought to be probably pregnant. On May 10, 1930, she was found to be two months pregnant. The urine contained no albumin.

Termination of pregnancy and sterilization were advised. On May 23, 1930, the uterus was evacuated by abdominal hysterotomy. Sterilization was effected by double salpingectomy and ventro-suspension was performed, as there was slight oozing from the uterine wound.

Mrs. F., aged twenty-nine years, was admitted to hospital on January 14, 1934, complaining of violent headaches, vomiting and blurred vision.

She had had one child seven years before, eclampsia supervening in spite of eliminative treatment.

On examination on admission to hospital the systolic blood pressure was 158 millimetres of mercury (later in the day it rose to 192 millimetres of mercury). The urine contained one-fifth albumin. She was twenty-four weeks pregnant. After one week of eliminative treatment the blood pressure fell to normal and there was but a trace of albumin in the urine. The *fundus oculi* showed pallor and retinal œdema round the disks. There was no retinitis.

On January 26, 1934, the urea concentration test showed 0·4% and 0·6% of urea at the end of the first and second hours respectively. It was decided that the patient was suffering from chronic nephritis and that it would be impossible to carry her on to term.

On January 27, 1934, abdominal hysterotomy was performed under open ether anæsthesia, from each tube a piece measuring 2·5 centimetres (one inch) was excised and the ends were buried. Convalescence was normal, apart from an attack of *otitis media*.

Mrs. W., aged thirty-six years, was first seen on August 16, 1933, when she complained of severe vomiting and deterioration in general health. On examination she was found to be two months pregnant. The systolic blood pressure was 110 and the diastolic pressure 75 millimetres of mercury. The urine contained no albumin.

Of five previous pregnancies, the first was normal, the second and third were terminated before term because of renal complications, the fourth ended in an abortion, and the fifth, although complicated by albuminuria, went to full term, the child dying four days later.

Induction of abortion and sterilization were recommended. On August 22, 1933, the uterus was emptied by abdominal hysterotomy under ether anæsthesia induced by the open method. From each Fallopian tube a section measuring 2·5 centimetres (one inch) was excised and the ends were buried. Recovery was uninterrupted.

Patients who have had a toxæmic pregnancy are advised not to become pregnant for at least two years, to allow the kidneys time to recover. In one case induction was performed because the patient became pregnant shortly after a pregnancy complicated by preeclampsia.

Mrs. W., when seen first on January 27, 1930, was fourteen weeks pregnant. She complained of headaches and nocturnal frequency of micturition. Examination confirmed the diagnosis of pregnancy. There was no œdema. The systolic blood pressure was 160 and the diastolic pressure was 90 millimetres of mercury. The *fundi oculorum* were normal and there was no albuminuria.

She gave a history that her first pregnancy, which had been complicated by preeclampsia, terminated in June, 1929, with the birth of a dead fœtus. Termination of the pregnancy was decided on, and on January 29, 1930, under general anæsthesia, the cervix was dilated and the uterine contents were evacuated with the finger and curette. The puerperium was uneventful, and since then the patient has had three normal confinements.

In another case pregnancy followed closely on an attack of acute nephritis.

Mrs. G. gave a history that she was hardly ever well. During recent years she had had two attacks of hæmoptysis, and eight months before an attack of acute nephritis. She had five living children.

On examination the patient was a sickly looking woman. The chest showed no definite signs. The blood pressure was low and the urine contained no albumin. She was two months pregnant. In view of the recent attack of nephritis and general ill-health, it was considered justifiable to terminate the pregnancy.

On December 4, 1934, under gas and oxygen anæsthesia, the cervix was dilated and the uterus evacuated. The convalescence was uneventful.

In another case labour was induced during an acute exacerbation of chronic nephritis.

Mrs. T., aged twenty-five years, was admitted to the Ballarat District Hospital on February 20, 1935. The last normal menstrual period had been fourteen weeks before. Routine ante-natal examination by her medical attendant had shown the presence of a large amount of albumin in her urine. She had been an in-patient at the Ballarat District Hospital, suffering from acute maxillary antritis, and this subsiding with expectant treatment, she had been discharged one week before readmission.

She complained of vague abdominal pains, headache and weakness. She had been in Saint Vincent's Hospital three years before with nephritis.

On examination the uterus was enlarged to the size of an eighteen to twenty weeks pregnancy. The *os uteri* was closed. The systolic blood pressure was 148 millimetres of mercury. The urine contained much albumin and blood. During the next six days the amount of albumin in the urine varied, but some was always present. The systolic blood pressure varied from 178 to 180 millimetres of mercury and the amount of urine from 24 ounces + to 33 ounces +.

It was decided to terminate the pregnancy. It was considered that the maxillary antritis had caused an acute exacerbation of a preexisting chronic nephritis and that therefore it would be wise to remove the extra strain imposed on the kidneys by the presence of a pregnancy.

On February 26, 1935, under spinal analgesia (two cubic centimetres of 8% "Novocain" being used), vaginal hysterotomy was performed. The products of conception were removed—the disparity between the period of amenorrhœa and the size of the uterus was found to be due to a condition of hydramnios. The cervix was sutured with number 2 chromicized catgut. The operation was rendered tedious and difficult by a long narrow vagina. There was no post-operative disturbance, apart from a rise of temperature to 38° C. (100·4° F.) and a rise in pulse rate to 100 to 120 beats per minute for two days afterwards. The systolic blood pressure fell to 140 to 150 millimetres of mercury, but there was no improvement in the amount of albumin in the urine.

The patient left hospital at her own wish five weeks after the operation. The systolic blood pressure was then 136 millimetres of mercury and the urine still contained a large amount of albumin.

In the next group are two patients in whom the indications were less definite.

Mrs. D., aged twenty-eight years, was attended by the writer in January, 1929, with her first pregnancy, which was complicated by preeclampsia. The child survived. In 1932 she again became pregnant and with much difficulty was persuaded to allow the pregnancy to continue. Premature labour had to be induced on September 24, 1932, for acute hydramnios with extreme distress. The labour resulted in the birth of a monstrosity.

During the next six to eight months the patient was continually ailing, suffering chiefly from chronic pyelitis, and was in continual dread of another pregnancy.

On August 16, 1933, she again consulted the writer, complaining of excessive vomiting and general ill-health; she was then two months pregnant and was very averse to continuing with the pregnancy. After a consultation it was decided to induce an abortion and at the request of the patient and her husband sterilization was promised.

On August 22, 1933, the uterus was evacuated by means of an abdominal hysterotomy and sterilization was performed by excising from the tubes a section 2·5 centimetres (one inch) long and burying the divided ends.

Mrs. W., aged twenty-nine years, a four *para*, was first seen in consultation with Dr. Salter on April 4, 1934. She was practically never well. After each delivery convalescence was very delayed—some months after the first, twelve months after the second, and some four months after the third (following a twin pregnancy). She was then two months pregnant. Induction of abortion and sterilization were advised.

On April 6, 1934, the uterus was evacuated by abdominal hysterotomy and a section 2·5 centimetres (one inch) long was excised from the tubes.

Hyperemesis.

Induction of abortion was considered necessary in one case of *hyperemesis gravidarum*.

Mrs. B., aged twenty-nine years, was admitted to the Ballarat District Hospital on September 12, 1934, with a history of vomiting of increasing severity of six weeks' duration. At the time of her admission to hospital it was continuous. She noticed that she was passing less urine than was usual. She had lost 6·3 kilograms (one stone) in weight in the preceding six weeks.

She gave the following obstetrical history. She was a four *para*; the first pregnancy, four and a half years ago, was normal. The second was terminated because of excessive vomiting; the third pregnancy was carried to a successful termination in spite of much vomiting.

On examination the patient was emaciated and showed evidence of much dehydration. She was ten weeks pregnant. After five days' expectant treatment she seemed much worse and the conjunctiva showed a definite icteric tinge. Under gas and oxygen anæsthesia the cervix was dilated and the uterus was evacuated. Improvement was immediate.

Dystocia and Birth Injuries.

Induction was performed in one case for repeated dystocia and birth injuries.

Mrs. R., aged forty years, was a seven *para*. She gave the following obstetrical history. The first child was 5·4 kilograms (twelve pounds) in weight and was born in an occipito-posterior position. It lived eight days. The second labour (twelve years ago) was complicated also by an occipito-posterior position. The confinement was difficult and was followed by a vesico-vaginal fistula. The third pregnancy ended in a miscarriage at six and a half months, the fourth in a premature labour at eight months, and the fifth in a premature breech labour at six and a half months. The fistula was three times operated on, the second attempt being successful. After the last confinement it recurred and has since been operated on with considerable relief but not cure.

On examination on May 3, 1934, she was found to be six weeks pregnant, to have much urinary infection and a small vesico-vaginal fistula high up in the vaginal vault.

On May 8, 1934, the uterus was evacuated by abdominal hysterotomy. A section measuring 2·5 centimetres (one inch) was excised from the tubes and a cystic right ovary was excised.

Cardiac Disease.

Cardiac disease was the indication for the termination of pregnancy in one case. In general it may be said that patients in whom cardiac disease is complicated by pregnancy must be treated primarily as cardiac patients and the question of any interference with the pregnancy must be disregarded.

The patients seen may be divided into several groups: (i) Patients in whom compensation is good. In these the general management is all important, by rest *et cetera*. (ii) Patients in whom compensation is not satisfactory. These again fall into two groups. In the first of these, if the patient is seen early in pregnancy, the pregnancy can be terminated by abdominal hysterotomy under local anæsthesia, with sterilization if desired. In the second group, if the patient is seen late in pregnancy, treat the cardiac condition by rest, digitalis *et cetera*, and only if medical treatment fails may termination of the pregnancy by Cæsarean section under spinal analgesia be considered.

Mrs. F., aged forty-five years, a four *para*, complained of dyspnœa on exertion for the last two months. She had no œdema. She had had rheumatic fever at the age of fourteen years, when she was in bed for three or four months. Her last pregnancy had been terminated six years ago, when she was fourteen weeks pregnant, for cardiac disease.

When first examined on April 2, 1935, the patient was found to be twenty-two to twenty-four weeks pregnant. The pulse was irregular in rhythm, but the volume was good. The apex beat of the heart was in the sixth interspace, 10·0 centimetres (four inches) from the mid-line. The area of right cardiac dulness was not increased. There was a rough systolic bruit at the apex conducted towards the axilla. The second sound was faint but clear. There was a systolic bruit at the aortic area, the second sound being clear. The lungs were clear and there was no œdema of the feet.

On April 17, 1935, she was seen by Dr. James, who considered her condition to be one of mitral stenosis with frequent extrasystoles. He thought that she would almost certainly develop auricular fibrillation with the strain of pregnancy, and advised early induction of abortion to prevent this.

On April 24, 1935, under ether anæsthesia induced by the open method, abdominal hysterotomy was performed and the uterus was emptied. Partial salpingectomy was performed and the peripheral ends of the tubes were buried. The pulse rate became suddenly elevated some hours after her return to the ward, but quickly fell again, and convalescence was uneventful.

This case does not fall definitely into either of the groups mentioned above, and induction was performed prophylactically rather than therapeutically.

Tuberculosis.

Tuberculous patients usually improve during pregnancy and deteriorate more rapidly during the puerperium. The outlook has in recent years changed very markedly in regard to these cases. While earlier, tuberculosis was considered to be an indication for prompt induction of abortion in most of these, now the general trend of opinion has swung to the opposite extreme—a policy of non-interference.

In most cases, particularly if pregnancy is far advanced, induction of abortion causes as much harm as labour at term. The writer considers, however, that in acute disease discovered early in pregnancy abortion is indicated. Many reasons have been given to account for the unfavourable effect of pregnancy in this disease: (i) demineralization caused by the growing demands of the fœtus; (ii) lowering of resistance by nausea and vomiting in early pregnancy; (iii) sudden lowering, after labour, of increased intraabdominal pressure which has caused basal collapse of the lung and temporary improvement (an effect comparable with that of phrenic ablation). Induction should not be performed unless the patient is willing to go into a sanatorium or other place where treatment will be adequate.

Another possible indication is in the case of a patient having a quiescent lesion, when recovery has been a matter of some difficulty.

Methods suitable in these cases are: (i) dilatation and curettage of the uterus under chloroform anæsthesia; (ii) dilatation and packing; (iii) insertion of a number 7 catheter, injection of five cubic centimetres of glycerine, after which laminaria tents may be inserted and the vagina packed with gauze soaked in glycerine and acriflavine. The packing may be removed in twenty-four hours.

Mrs. W., aged twenty-three years, was admitted to hospital on May 1, 1935. She gave a history that for three or four years she had had a cough with some sputum, but had felt fairly well. Two years ago her first baby was born; she had been quite well during the pregnancy and puerperium. Two weeks after going home she had an attack of pleurisy and was kept in bed for three months. Since then she has spent much time in bed, being definitely diagnosed as having tuberculosis. She had spent the last eight months continuously in bed. During the last two months she had vomited a good deal and the cough seemed more severe.

On examination the patient was a pale-faced young woman. The lungs showed dulness on percussion at both apices anteriorly and posteriorly. Expiration was prolonged and there were moist sounds at both apices posteriorly. The left lung showed moist sounds all down the posterior surface. Whispering pectoriloquy was present at the right apex and all down the left side posteriorly. On vaginal examination she was found to be fourteen to sixteen weeks pregnant.

On May 3, 1935, the sputum was found to be loaded with tubercle bacilli. The physician in charge gave the patient a fairly good prognosis with sanatorium treatment if the burden of pregnancy were removed, and it was decided to terminate the pregnancy.

On May 17, 1935, with a very brief chloroform anæsthesia the cervix was dilated and packed with gauze. The vagina was also packed. On May 18, 1935, the packing was removed. As no pains followed, several courses of six injections of pituitrin, 0·25 cubic centimetre (four minims), every half hour, were given during the next few days. On May 23, 1935, the patient expelled twin fœtuses and later expelled chorionic tissue which appeared incomplete. On May 27, 1935, the temperature was 38·9° C. (102° F.) and she expelled more chorionic tissue. Glycerine lavage was ordered to be repeated daily. On June 2, 1935, the temperature was normal and the patient felt well.

In all, fourteen pregnancies were terminated, ten by the abdominal route and four vaginally. The ten cases of abdominal hysterotomy were accompanied by no mortality or morbidity.

In the tuberculous case, where the vaginal route was chosen, the temperature was elevated for several days. It would have been better in this instance to have used a rubber catheter with glycerine injection and to have secured a more prompt response.

Choice of Operation.

1. For all cases in which sterilization is deemed advisable, abdominal hysterotomy is the operation of choice. It is speedier and causes far less hæmorrhage than curettage followed by abdominal section. If there is any persistent oozing from the uterine suture line, adhesions can be prevented by ventrosuspension. Any other abnormality may be seen and dealt with at the same time.

2. For cases in which pregnancy has advanced to more than fourteen weeks and in which sterilization is not contemplated, abdominal hysterotomy is still the easier and safer course.

3. When pregnancy has advanced to more than fourteen weeks and it is for any reason unwise to risk any interference with gastro-intestinal function, vaginal hysterotomy, if necessary under spinal analgesia, is the best procedure. It is more tedious and difficult, especially if, as in the case quoted, the patient has not had a full-time child previously. It causes practically no shock or disturbance of any kind.

If a simpler type of procedure, which, however, is not so quickly effective, is desired, a two-stage operation may be performed. As the first stage the cervix is dilated with graduated dilators and gauze packing is inserted. The vagina is then packed. Abortion occurs naturally and, if it is incomplete, the uterus may be curetted subsequently. This method may take some days.

4. In cases in which pregnancy has not advanced beyond twelve to fourteen weeks, dilatation and curettage may be performed as a one-stage operation. If pregnancy has advanced beyond this stage, this operation is difficult and dangerous.

Technique Used for Abdominal Hysterotomy.

The abdomen was opened through a paramedian incision below the umbilicus, the rectus muscle being reflected outwards. One cubic centimetre of pituitrin was injected intramuscularly before incision of the uterus.

The uterus was raised with the hand and large packs were inserted behind so as to isolate it from the peritoneal cavity.

An incision about 3·7 to 5·0 centimetres (one and a half to two inches) long was made in the midline of the anterior wall of the uterus, ceasing at the upper limit of the loose peritoneal attachment. The uterine contents were evacuated with the gauze-covered finger, followed by scraping with a curette or the handle of the knife. In one case the diathermy knife was used throughout.

Three or four mattress sutures of number 3 chromicized gut were inserted and tied, effectually stopping most of the bleeding. These penetrated the whole thickness of the uterine wall but missed the mucous membrane.

If there was still any hæmorrhage, a continuous mattress suture of number 2 chromicized gut was inserted as well. Otherwise a continuous suture of number 2 plain gut brought the edges of the uterine wound together.

Where sterilization has been performed, one of two techniques has been chosen.

In the first a section 2·5 centimetres (one inch) long was excised from the middle of each Fallopian tube; the ends were tied with silk and buried. The proximal segment was buried between the layers of the broad ligament and the distal segment was tucked under the posterior surface of the broad ligament.

In the more advanced cases time is lost by checking bleeding caused while separating the layers of the broad ligament, and in these partial salpingectomy was chosen. In this operation the outer half of the tube is excised; the inner end is tied with silk and the broad ligament is sutured over it.

The packs were removed and the peritoneal toilet was completed. It should not be necessary to remove more than the smallest quantity of blood from the peritoneal cavity.

There were no special points in the after-treatment, any disturbance being remarkably small.

PARALYSIS OF THE EXTERNAL RECTUS MUSCLE: AN INQUIRY INTO THE REASONS FOR POST-OPERATIVE RESTORATION OF LATERAL MOVEMENT.

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Consideration of the reasons underlying the post-operative restoration of lateral movement to an eye previously immobile in that direction, owing to failure of function of its external rectus muscle, opens up an interesting field of speculation. It is not enough merely to say that parts of certain other ocular muscles, having been transplanted to new positions, exert a pull upon the eyeball from a fresh direction, with restoration of lateral movement. The question is, why do certain muscles appear to assume a function of abduction when formerly their action appeared to be of quite a different nature? I use the word appear advisedly, for reasons which will become obvious in due course.

Let us first consider very briefly the relevant details of the operation which has been performed recently with such signal success by my colleague Dr. Temple Smith in Sydney, and by certain other ophthalmic surgeons in different parts of the world.

Following upon a very free tenoplasty or a tenotomy of the medial rectus, the lateral third or half of the superior rectus is split longitudinally from the remainder of that muscle, the splitting extending from the muscle attachment backwards for some ten millimetres. This slip of tendon and muscle is detached from the globe, carried laterally and reattached to the eyeball immediately behind the attachment of the non-functioning lateral rectus muscle. Exactly the same procedure is then carried out upon the inferior rectus muscle. We have now a slip from the superior rectus and a slip from the inferior rectus attached to the sclera just behind the normal attachment of the lateral rectus, the remainder of each superior and inferior rectus remaining undisturbed.

One should note here that M. E. Marcove, writing in the *American Journal of Ophthalmology*, November, 1934, has recommended the use of a slip from the medial rather than from the outer side of the superior and inferior recti. These slips he brings outwards behind the undisturbed portions of the respective muscles, to reattach them to the sclera behind the attachment of the lateral rectus in just the same way as that already described. There is a sound mechanical reason for this use of a medial rather than a lateral part of the muscle, as I shall point out later.

The result of this operation has been the restoration of at least 40° of lateral movement to eyes which previously had no rotation in this direction.

We have to consider first how abduction becomes mechanically possible and then—an even more surprising thing—how abduction takes place when it is desired by the individual.

The Mechanical Aspect.

There are those who are apt to forget that the four recti muscles do not diverge from their scleral attachments upwards, downwards, inwards and outwards in the form of a cross. On the contrary, it must be remembered that all four muscles take their origin from the annulus of Zinn at the apex of the orbit, and that because this tendinous tube of origin has a diameter considerably less than that of the eyeball at its equator, the four muscles must diverge from one another as they proceed forwards to the equator. Further, one must remember that the muscle origin is at a relatively considerable distance from the attachments and that the long axis of each rectus muscle does not coincide with the sagittal axis of the eyeball, but, with the exception of the medial rectus, inclines laterally forwards, thus making an angle with the visual axis of the globe. The medial rectus also makes an angle with the visual axis, but it inclines a little upwards and medialwards as it passes forwards. In the case of the superior and inferior recti this lateral inclination of the long axis of the muscle is such that it makes with the sagittal axis of the globe an angle of about 25°.

The last mentioned points are the more easily understood when we recall the fact that the long axis of the orbital cavity deviates laterally from the visual axis, making an angle of 23° to 25° with it.

The visual axes are roughly parallel with one another, at most forming an angle of 10°, whereas the orbital axes enclose an angle of about 45°.

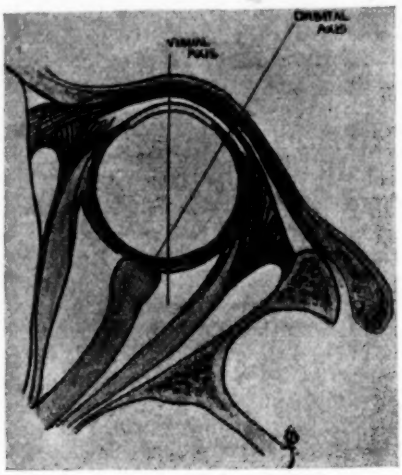

FIGURE I.

Schematic view of a horizontal section through the right orbit (after Whitnall), to show position of attachment of medial and lateral rectus, and the angle formed by the visual and orbital axes.

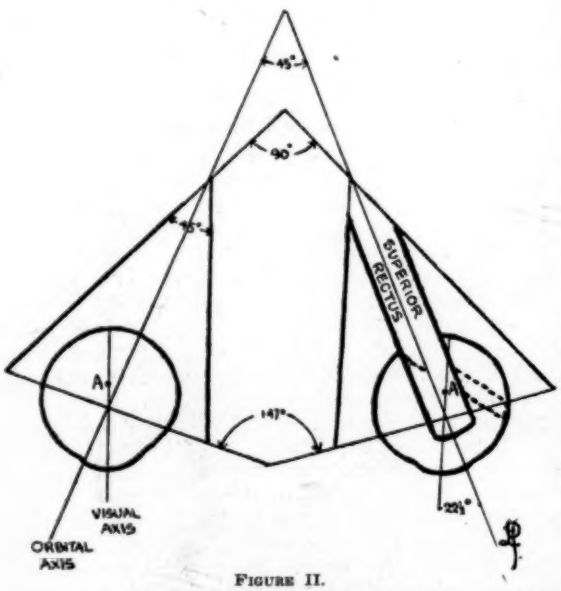

FIGURE II.

Linear reconstruction of horizontal section through the orbits, to illustrate the angles formed by the walls (after Whitnall). A: Centre of movement. The medial third of the superior rectus is shown in its new position by means of dotted lines.

It is now necessary to review the actions of the orbital muscles, and this must be done in considerable detail so that all the data necessary to the proper appreciation of the problem under consideration may be made available.

The Action of the Muscles.[1]—The movements of the eyeball have been resolved by Fuchs (1917) into components which correspond to three primary axes, perpendicular to each other and intersecting at its "centre of movement" or "point of rotation"; this point in an emmetropic eye is situated, not at the mathematical centre of the globe, but a little behind the mid-point of its antero-posterior axis, or fourteen millimetres behind the summit of the cornea and ten millimetres in front of the posterior pole. The three primary axes are: (i) The vertical axis, around which lateral movements occur to the right and left, that is, abduction and adduction or divergence and convergence of the cornea upon the horizontal plane. (ii) The frontal axis, running from right to left, and related to movements of elevation and depression of the cornea. (iii) The sagittal axis, passing from before backwards, corresponding to the visual axis, and correlated with medial and lateral rotation, or intorsion and extorsion of the cornea.

As regards the actions of the muscles, it is first to be emphasized that the eyeball is delicately poised in the fascia and fat of the orbit; the capsule of Tenon forms its primary socket, and the two, globe and fascia, move together in any but the smallest excursions upon the bed of fat which completely fills the surrounding space up to the bony orbital wall. The globe undergoes no change of place as a whole, but simply rotates about the centre of movement; since, however, this point is not the mathematical centre of the eyeball, it is correct to describe the movement as oscillation rather than as rotation. A state of equilibrium is maintained by the tonicity of all the ocular muscles, and it is impossible for any one muscle to act individually without the others participating both in the movement and in the maintenance of the new position of the globe; in every motion from three to five muscles participate, one or two acting directly and the others helping by steadying the course.

As a whole, the four recti may be regarded as retractors of the eyeball; they are antagonized by the two obliques, which, from their origins and directions, are protractors (apart from their pull nasalwards on the globe), and this is probably the active element in maintaining the equilibrium of the globe (Theobald, 1918). The medial and lateral recti are nearly perfect antagonists in movements of the cornea upon a horizontal plane. The superior and inferior recti are opposed in producing elevation and depression and in torsion, but both act as adductors. The two oblique muscles rotate the eyeball in opposite directions in elevation and depression of the cornea and in torsion, but both produce abduction. Thus the equilibrium of the globe is assured by the anatomical dispositions of the muscles; in movements the action of a contracting muscle which shortens in full extent about a quarter of its length, is moderated by its antagonizer which elongates to the requisite degree.

The individual action of each muscle can be described as determined by its anatomical dis-

position as follows, but it is to be noted that, except for the medial and lateral recti, each has a main and subsidiary action. The medial rectus is the adductor of the eye, turning the cornea medialwards, and the movement is sensibly direct, with a possible excursion of 45°. The lateral rectus has a directly opposite action; it is the abductor of the eye and directs the cornea lateralwards; the motion is direct and has an excursion of nearly the same extent as that of the medial rectus. The superior rectus is an elevator of the cornea, but since its direction does not coincide with the sagittal axis of the eyeball, but forms an angle of 23° with it, and since its insertion falls on the anterior hemisphere in front of the centre of movement of the globe, it will not only elevate, but adduct, and can; moreover, incline the upper end of the vertical axis medialwards, that is, rotate the globe in this direction. The action then is to elevate, adduct and intort the cornea. The inferior rectus is a depressor of the eye, but since, like the superior rectus, its long axis inclines laterally forwards and so makes an angle with the visual axis of the globe, it also possesses a slight action of adduction, directing the cornea medially; it can also cause a small degree of extorsion, and its action, therefore, is to depress, adduct and extort the cornea.

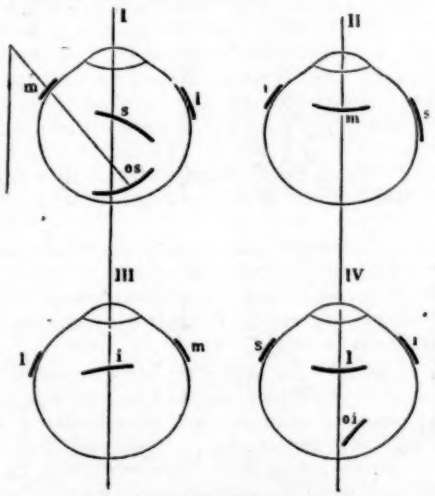

FIGURE III.

Schematic representation of the line of the muscle insertions on to the eyeball (from Merkel, 1901). Natural size. I, seen from above; II, from the medial side; III, from below; IV, from the lateral side. s = superior rectus, i = inferior rectus, m = medial rectus, l = lateral rectus, os = superior oblique, oi = inferior oblique. [Reproduced from Whitnall's "Anatomy of the Human Orbit."]

The superior oblique must be considered to act relatively to the globe from its physiological origin at the pulley. Primarily it will raise the posterior hemisphere of the globe, to the upper aspect of which it is fixed, and so depress the cornea, but since it is also inserted behind the centre of movement of the globe at an angle of 39° to the optic axis (Figure III), it will at the same time draw the posterior pole medially, so abducting the cornea. Finally, from its insertion laterally to the sagittal meridian, it can rotate the eyeball slightly medialwards. Its action, therefore, is to depress, abduct and intort the cornea. The inferior oblique similarly can be understood from its position beneath the globe and its insertion on the posterior hemisphere to the lateral side of the sagittal meridian, primarily to elevate, secondarily to abduct and extort the cornea.

It would seem that, were it not for the forward divergence of the orbital axes and the consequent angular pull of the superior and inferior recti, the need for post-equatorial insertion of the oblique muscles to counteract this secondary action of the recti would disappear. Conversely, if the antagonism to the post-equatorial pull of the oblique muscles were removed or decreased by shifting the insertions of the superior and inferior recti in whole or part to a more lateral position, then the oblique muscles would have an enhanced power of abduction (*vide infra*).

The movements of the cornea are caused by combinations of these individual muscular actions. Thus direct elevation results from the combined action of the superior rectus and inferior oblique; depression is effected by the inferior rectus and superior oblique; abduction by the lateral rectus is assisted by the two obliques, especially towards the end of the movement; adduction by the medial rectus is assisted towards the end of its excursion by the superior and inferior recti. This adduction action will be decreased to a greater degree when medial slips of muscle are used in the above-mentioned operation than when lateral slips are employed, because the most advantageous part of the superior or inferior rectus for the function of adduction is that nearer the mid-line, and it is this part which has been detached (*vide infra*).

The structure of the ocular muscles has been specially studied by Schiefferdecker (1905), who found that the parallel fasciculi of muscle fibres of which they consist are remarkable for the richness of their nerve supply and the large amount of elastic fibres in the perimysium and intermuscular septa. The latter character is responsible for a passive contraction of the muscle after extension by its antagonizer, the action of which is, moreover, moderated by the same means; the provision insures a delicate regulation of the eye movements. It may be pointed out here that the parallel disposition of the fasciculi of muscle fibres and the richness of their nerve supply make it less likely that the nerve supply to either slip of muscle will be interfered with to any great extent when the muscle is split at operation.

Summarizing the foregoing facts, we find that the muscles capable of producing abduction are the lateral rectus, the superior oblique and the inferior oblique muscles. Opposing this action we have the medial rectus, the superior rectus and the inferior rectus muscles. When the tendon of the medial rectus has been divided there remain only the superior and inferior recti as antagonists of

abduction. We have already noted the fact that since the long axes of these muscles do not coincide with the sagittal axis if the eyeball, but form an angle of 23° with it, and since their insertions fall on the anterior hemisphere in front of the centre of movement of the globe, they will not only elevate or depress, but also adduct it (see Figure II).

From the figure it will be seen that the line joining the origin and insertion of each of these two muscles, that is, the long axis, lies to the medial side of the centre of movement of the globe, and it will be easily understood how contraction of the two muscles in unison will bring about adduction. If the muscle attachments were moved more medially, that is, nearer to the attachment of the medial rectus, by so much more would the power of adduction be increased. Conversely, if the muscle attachments were moved more laterally, that is, nearer to the attachment of the lateral rectus, by so much more would the power of adduction be decreased and that of abduction be increased; so that if the lateral displacement of the attachments were so great as to bring the long axes of the muscles wholly external to the centre of movement of the globe, then, with the two muscles contracting simultaneously, adduction would be abolished and abduction would take its place.

Actually at operation the whole of the muscle is not displaced—part is left to carry out the primary function of elevation or depression. But it will be seen from the foregoing that better results should be obtained by detaching a medial rather than a lateral slip, because we should thus remove from its sphere of action that part of the muscle having the most advantageous purchase upon the globe for the act of adduction; in other words, we should move the long axis of the more medial part of the muscle to a meridian external to the centre of movement of the globe.

The operation then would appear to lessen, or if a medial slip of muscle be detached, probably abolish completely, the power of adduction of the superior and inferior recti, giving to them instead some measure of abduction by virtue of the lateral displacement of a part of these muscles beyond the centre of movement of the globe, at the same time allowing the superior and inferior oblique muscles to accomplish without opposition, or at least with very much lessened opposition, their secondary function of abduction.

The Functional Aspect.

Having considered how the restoration of abduction becomes mechanically possible, we are still left with the problem as to why abduction actually takes place at the will of the individual.

It has been pointed out above that a state of equilibrium is maintained by the tonicity of all the ocular muscles and that individually it is impossible for any one muscle to act without the others participating both in the movement and in the maintenance of the new position of the globe. The ocular muscles are, therefore, constantly in a state of controlled expectancy, ready to carry out smoothly and in unison any ocular movement called for by the individual; and it would appear that if the muscle having as its primary function the movement in question be incapable of action, then those muscles whose secondary function is the performance of this movement will come to the rescue and carry out the movement, provided the opposition to them be not too great.

In view of its probable bearing upon this matter of simultaneous participation of all the muscles, both in movement and in the maintenance of position, it is well to remember the very intimate connexions established between various nuclei, including the motor nuclei of the eye muscles, by way of the posterior longitudinal bundle.[2] This is a very conspicuous tract of longitudinal nerve fibres which extends throughout the whole length of the medulla, pons and mesencephalon in the *formatio reticularis* or tegmental part of each. Below, at the decussation of the pyramids, it becomes continuous with the anterior basis bundle of the cord.

One of the most salient features is the intimate association that it presents with the three motor nuclei from which the nerves for the supply of the muscles of the eyeball take origin. Into each of these nuclei it sends many collaterals, and probably also some of its constituent fibres, and these end in terminal arborizations around the nuclear cells. It would appear, therefore, that one of the most important functions of this strand is to bind together these nuclei and thus enable them to act in harmony with each other. Fibres also enter the posterior longitudinal bundle from the auditory system and perhaps also from the facial and other motor nuclei.

That the posterior longitudinal bundle is a brain tract of high importance is evident from the fact that it is present in all vertebrates and, further, that its fibres assume their medullary sheaths at an extremely early period.

It is probably through this close association by way of the posterior longitudinal bundle that a kind of community of interest is established among the nuclei of the nerves supplying the ocular muscles, so that impulses for contraction are sent to whatever muscles are capable of assisting in a certain movement, whenever that particular movement has been decided upon and called for by the individual.

I think, then, that the following is a satisfactory explanation of the ability of the individual to produce movement of the eye when this has been made mechanically possible by operation. Certain teams of muscles are accustomed to act together in the production of certain movements, the appropriate nerve impulses being sent to all the members of the team; in any desired movement of the eyeball the team producing the movement is antagonized by an opposing team to just that extent necessary to steady the globe in the movement, and by no more; if one member of the movement-producing team

ceases to function, owing, for example, to paralysis of its nerve supply, the remaining members of the team will still receive their nerve impulses and accomplish the desired movement, provided the antagonism of the opposing team has been lessened by an amount equal to that power lost by the movement-producing team.

Thus in the normal eye lateral movement is carried out by the following team: the lateral rectus and the two oblique muscles, all three of which receive an appropriate nervous impulse to carry out the movement. The movement is antagonized by a team made up of the medial rectus and the superior and inferior recti, all three of which exert just sufficient opposition to steady the globe. If the lateral rectus be paralysed, the opposition is made too great by that degree of power which the lateral rectus did, but no longer can, exert. If, then, the tendon of the opposing medial rectus be divided and the adducting power of the superior and inferior recti lessened by lateral transplantation of part of their attachments, ample lessening of opposition will have been accomplished, and the two oblique muscles, still receiving their normal nervous impulse for the act of abduction, will be able to overcome the remaining opposition and abduction will take place.

Conclusion.

1. By operation it is possible to restore the power of abduction to an eye deprived of this function by paralysis of the lateral rectus muscle.

2. It has been shown how abduction is made mechanically possible and from this how abduction becomes functionally possible.

References.

(1) S. E. Whitnall: "The Anatomy of the Human Orbit", page 276.
(2) D. J. Cunningham: "Text Book of Anatomy", Third Edition, page 522.

Reports of Cases.

POLYNEURITIS GRAVIDARUM.

By BERTRAND A. COOK, M.B., Ch.M. (Sydney),
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D.M.C., married, aged twenty-eight, consulted me in June, 1934, for what she termed "morning sickness". In addition, I noticed at the time a mental dulness, and languor with confusion. In error, I ascribed some of the features as having relation to her social position, for she is the wife of a publican. A month later she was no better, but, in addition, had tingling of the arms and legs with vomiting, *plus* loss of knee and ankle jerks, together with wrist- and ankle-drop. The husband denied a history of potus, and, satisfying myself of her pregnancy, I provisionally diagnosed her condition as polyneuritis of pregnancy, although I was merely going on what I had read, not having seen a case previously. At this stage she was put on a high carbohydrate diet with liberal vitamin intake, especially vitamin *B*, with a sedative alkaline mixture with "Ostelin" liquid. The last mentioned was continued throughout. For further investigation I advised her to go to Sydney, which she did. According to her husband, she consulted a number of physicians, with varying advice. Several consultants advised immediate termination of pregnancy (at this stage she would be twenty-six weeks pregnant). This advice was not accepted, mainly on religious grounds, and she was admitted to a hospital for investigation and treatment. She was in the institution for about three weeks and left, I understand, at her own request. Two of the honorary medical officers, I was informed, confirmed the diagnosis, but I had no communication from them, mainly, no doubt, on account of the original note regarding the case having been lost by the patient; but one of the honorary physicians wrote me a note giving a brief *résumé* of the literature and hints on treatment. I had hoped that that gentleman would collaborate with me in this report, but he generously wrote me denying all credit for the case. However, I am hopeful that I can induce him in a further report to comment on this case and review the literature at length.

On the patient's return there was an aggravation of the foot-drop and wrist-drop, with inability to walk and weakened hand grip. Splinting was instituted and combined with massage; "Marmite" and yeast were pushed to toleration point, open air sleeping and general hygienic measures were adopted, as well as a generous sun tanning; I hoped by the sun tanning, in addition to the usual effects, to augment the vitamin intake. I understand that a regimen of one ounce of glucose combined with ten units of insulin three times daily had been instituted at the hospital in which the patient was treated in Sydney, but the patient refused to continue with this on her return.

Progress and Termination.

The chief points noticed in the worst stages were: Korsakoff's syndrome, vomiting, depression, loss of peripheral reflexes, tenderness in extremities, ankle-drop and wrist-drop, inability to stand, anorexia and mild anæmia. Very curiously the patient always looked well and kept her condition apart from muscle wasting. Progress was slow but sure. Memory of recent events returned early. The grip gradually improved and the neuritis of the finger tips improved to such an extent that she was able to complete the *layette*. Muscles regained tone, and, when provided with lace-up boots, the patient could walk unaided. She could now feed herself, and at the end of her term was brighter and much happier. On February 25, 1935, she came into labour. The labour was quick, even for a healthy *multipara*, lasting only three hours altogether, and there was no need for instrumental assistance. The result of the labour was a ten-pound female baby. The patient went home in eight days, and at date, April 4, 1935, is going about her household duties and breast feeding her baby.

Summary and Acknowledgements.

1. A case of *polyneuritis gravidarum* is reported.

2. The favourable termination by medical treatment without operative interference with the course of labour coincides with the views of some authorities as recorded below.

3. Strauss and McDonald's treatment was combined with other measures, as outlined above.

4. Reference to similar cases may be seen in the issue of *The Journal of the American Medical Association* of December 23, 1933.

5. I am indebted to Dr. James Hughes for his interest and helpful suggestions.

Reviews.

RECTAL AND COLONIC DISEASES.

THE book "Diseases of the Rectum and Colon and their Surgical Treatment", by Lockhart-Mummery, makes a welcome second appearance after eleven years with almost complete rearrangement.[1] Numerous illustrations have been added and it can be stated confidently that the work is worthy of the author, an authority on diseases of the large bowel.

The author has a facile pen, and his book, like all his articles, is readable, interesting and convincing. The anatomy of the rectum and colon is minutely described, and the fact that the mucous membrane about one inch above the anus can be cut or burnt without unpleasantness is a point of which few practitioners are aware: a circumstance that explains why a growth of large proportion may grow painlessly in the rectum and cause no symptoms till in an advanced state of development.

The author stresses the intimate association between the sensory nerves of the anal canal and neck of the bladder and urethra (and in the female the vagina) and that neuritis of the sacral nerves frequently causes pain referred to the anal region. This nerve connexion accentuates the constant necessity for a thorough examination of the anal canal and rectum in cases of pelvic pain.

It is the author's experience that if symptoms alone are used there will be a mistaken diagnosis in 50% of cases, and he thus recommends sigmoidoscopy as a routine measure in diagnosis.

Many useful prescriptions are given for anal troubles, and for the simplest and most complicated operations the pre-operative and post-operative treatment is fully described.

The author gives details of his own operation for piles. The need for gentleness in approaching a patient for examination is stressed.

Radium is fully discussed, and also the author's technique from a wide experience of its use, but one gathers that the results from its employment are on the whole unsatisfactory and that surgery stands preeminent in the treatment of cancer of the bowel. With this all experienced surgeons will agree. Much space is devoted to discussion of cancer of the rectum.

The fact that two-thirds of the patients with cancer of the rectum admitted to Saint Mark's Hospital, and over one-half in the author's private practice, have growths that are too advanced for operation shows the need for early diagnosis. He quotes the Ministry of Health's figures that in 600 consecutive cases of cancer of the rectum the average time between the onset of symptoms and the seeking of advice was one year.

The author is a great advocate of the perineal approach to cancer of the rectum, and he describes his operation fully and explicitly. His death rate with 340 cases was only 8%, with a recurrence rate of approximately 30% within five years. The Ministry of Health's figures for the mortality rate for abdomino-perineal excision are quoted as being 32%, but it is only just to readers to state that Ernest Miles's mortality rate for abdomino-perineal excision of the rectum is under 10%, with a very low recurrence rate.

The statement "one of the great obstacles to abdomino-perineal excision is injury to the ureters" will not be accepted by expert workers in this region, who have the ureters under constant vision, which is impossible in the perineal route.

In abdomino-perineal excision routine caecostomy is advised, and with this we cannot agree. Caecostomy should be used only when doubt exists as to the viability of the gut brought out for the colostomy.

Diseases of the colon are thoroughly gone into, their medical and surgical treatment are fully described, and the book is rounded off with an account of resection of the colon and the closing of fæcal fistulæ.

This book should be in the library of every surgeon who opens the abdomen, and the humblest practitioner will find in it valuable information to help him with the simplest of colonic, rectal and anal afflictions.

[1] "Diseases of the Rectum and Colon and their Surgical Treatment", by J. P. Lockhart-Mummery, F.R.C.S.E., M.A., M.B., B.C.; Second Edition; 1934. London: Baillière, Tindall and Cox. Royal 8vo., pp. 624, with 347 illustrations. Price: 35s. net.

ANÆSTHESIA.

THE "Handbook of Anæsthetics", by J. Stuart Ross and H. P. Fairlie, is an old friend in modernized dress.[1] It retains the excellent groundwork, especially in physiology and clinical principles, laid down by Dr. J. S. Ross. This has been brought into line with current developments by Dr. Fairlie, so that practically all of the major recent advances in anæsthesia receive mention. In this review attention will be drawn only to those sections which have been modernized in the present edition.

The first three chapters, dealing with physiology, are up to date and helpful. It would have been well, however, to have described at greater length the administration of carbon dioxide and to have made very clear to the student the type of case in which it is beneficial and that in which it may be injurious. The chapters on premedication and basal narcosis have been rewritten and provide a short but useful guide to this very confused subject. The modern technique in anæsthesia with nitrous oxide-oxygen and ethylene-oxygen is well described, and a short section is devoted to carbon dioxide absorption methods. The Boyle and McKesson machines are described as typical of all sight-feed and dry-flow apparatus respectively. The obsolescent McKesson model G apparatus is, however, illustrated instead of the modern indicating and recording "Nargrafs", which receive only a passing mention. The chapter on endotracheal anæsthesia has been rewritten in the light of Magill's work. It distinguishes between the old insufflational methods and the current low pressure technique. It does not, however, differentiate the technique in which two gum-elastic laryngeal catheters are passed, from that (more generally associated with the name of Magill) which employs a single wide bore rubber catheter and exhalation valve. Magill's nasal intubation of the larynx is described. Should this prove unsuccessful, it is recommended that a gum-elastic catheter be passed through the nose and introduced into the larynx with laryngoscope and Magill's forceps. A rubber catheter was surely here intended. The chapter would have gained from a fuller consideration of gas anæsthesia by the endotracheal technique. The section on ethyl chloride deals mainly with "closed" administration, which must surely be as unfamiliar to most English or German students as to Australian. The accidents and sequelæ of anæsthesia are well described, but mention might have been made of endotracheal insufflation of air or oxygen as an alternative to artificial respiration and tracheotomy. The value of post-anæsthetic inhalations of carbon dioxide-oxygen in combating respiratory sequelæ likewise deserves emphasis. The chapter on anæsthesia in midwifery now includes a short description of chloroform capsules and of gas-oxygen and gas-air analgesia. The two last named might have been considered at greater length. The chapters on regional, local and spinal anæsthesia have been brought up to date and include consideration of the present status of "high" and "low" spinal anæsthesia and of the value of "Percaine".

Previous editions of "Ross and Fairlie" have been familiar to several generations of Australian students. The present edition can be recommended to them with confidence. The trained anæsthetist, too, will glean many a hint from its perusal.

[1] "Handbook of Anæsthetics", by J. Stuart Ross, M.B., Ch.B., F.R.C.S.E., and H. P. Fairlie, M.D., with a chapter by W. Quarry Wood, M.D., F.R.C.S.E.; Fourth Edition, 1935. Edinburgh: E. and S. Livingstone. Crown 8vo., pp. 299. Price: 10s. 6d. net.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 7, 1935.

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NASAL SINUSITIS AND MENTAL DISORDER.

In view of the close anatomical relationship existing between the upper nasal sinuses and the cranial cavity, it is not surprising that pathologists interested in mental disease have inquired into the possible relationship between infective processes in the sinuses and mental disorder. At Birmingham, England, a great deal of work has been done on this subject, and in the forefront stands F. A. Pickworth, Director of the Joint Board of Research for Mental Disease of the City and University of Birmingham. Since 1928 Pickworth has published papers on different aspects of the subject and his views have commanded the serious attention of investigators. Australians who studied a selection of his specimens at the centenary meeting of the British Medical Association were impressed with what they saw, and were at least reminded of the possible dire sequelæ of sinus disease. Pickworth has recently published an important monograph entitled "Chronic Nasal Sinusitis and its Relation to Mental Disorder".[1] The work is one of outstanding merit; it should lead psychiatrists to set out on the road of inquiry, if they have not trodden the road before, and will make rhinologists and physicians ask themselves whether they have been sufficiently keen in their observation and relentless enough in their treatment of nasal sinusitis.

Pickworth has had several objects in writing his book. In the first place he has sought to indicate the existence, extent and complications of chronic nasal sinusitis occurring in mental hospital patients. Secondly, he wishes to draw attention to the mechanisms by which chronic nasal disease results in the physical changes of brain tissue that are present in certain forms of mental disorder. He also gives what he calls a practical clinico-pathological picture of mental disorder based upon functional changes of the cerebral capillaries. Pickworth bases his present study on his findings in 471 consecutive *post mortem* examinations. He sets out his findings in a table. This table refers only to gross macroscopic changes, "such as the presence of actual pus, gross thickening of the sinus membrane, or polypi within the sinus". In the series of 471 cases there were 157 instances in which all the sinuses were apparently normal. In 314 cases one or more sinuses showed evidence of infection; in 142 of these one or both sphenoidal sinuses were involved. In 325 cases the sphenoidal sinuses appeared to be normal. The percentage involvement of one or more sinuses in this series is thus 66·6. Pickworth states that Graves in 1932 reported an involvement in 80% of cases (37% sphenoidal sinusitis) among Birmingham mental hospital patients. It is noteworthy that other investigators have reported a much lower percentage of involvement than that reported from Birmingham. P. K. McCowan, writing in *The Lancet* of October 14, 1933, on "Infection of the Nasal Sinuses and Tonsils in the Psychoses", pointed out that at the Cardiff City Mental Hospital only 24 cases of sinusitis were found in 807 consecutive patients admitted to the institution. At this hospital it was customary to carry out a routine examination of the nose and throat of every patient on his admission. McCowan referred to figures previously published from Birmingham (those mentioned by Pickworth) according to which sinus involvement was found in

[1] "Chronic Nasal Sinusitis and its Relation to Mental Disorder", by F. A. Pickworth, B.Sc., M.B., B.S., A.I.C.; 1935. London: H. K. Lewis and Company, Limited. Super royal 8vo., pp. 168, with 83 illustrations. Price: 16s. net.

80% of cases. He thought that the chief reason for the difference in the percentage figures must lie in what is to be primarily regarded as sinusitis. The investigations at Cardiff were carried out on living patients and would not be likely to reveal the changes discoverable by the careful *post mortem* examinations that appear to be made at Birmingham. Pickworth is insistent on the need for realizing the significance of the very late evidences of past infection, and he refers to such residua of infection as thickening of the membrane, cystic collections of clear fluid, often only momentarily seen, polypi, inspissated secretion and irregularities in the bone. He presents his case in so convincing a fashion that no doubt can remain regarding the occurrence of nasal sinusitis in patients suffering from mental disorder.

Pickworth shows that the presence of diseased mucous membrane in the nasal accessory sinuses, particularly in the sphenoids, brings about a change in the perineural tissues. He claims that in this way an undue patency of the sheaths of the nerves is produced and that this patency provides a direct pathway for the passage of infection to the arachnoid space at the base of the brain. In one experiment he shows that injection of a diffusible dye in the subarachnoid space was followed by passage of the dye along the nerve and the appearance of dye in the antrum. In 80 of 200 microscopic examinations of the sphenoid bone organisms or filaments containing Gram-positive granules were found. In fifteen instances these were found in the bone, though the mucous membrane did not appear to be involved. Pickworth includes in a final chapter notes on thirty special cases. When these are read in conjunction with his discussion on the ætiological relationship of sinusitis to cerebral pathological change and mental disorder he is on debatable ground. Even if it be granted that changes in cerebral capillaries have resulted from nasal sepsis, it would not be right to argue that the vascular changes were necessarily responsible for the psychical disorder. McCowan was undoubtedly right when he wrote in 1933 that investigations of this kind should be carried out in a highly critical manner. Such an attitude will lead to investigation of nasal sinuses not only in the psychoses, but in other conditions. There is no doubt that far too little attention is paid to infection of the nasal sinuses and to effects that it may have in other parts of the body. For this reason, if for no other, all medical practitioners should study Pickworth's monograph.

Current Comment.

THE PLACE OF BLOOD TRANSFUSION.

ANYBODY unversed in the history of medicine might well think that blood transfusion is something new, that it is a newly discovered triumph of modern therapeutics. We know, however, that the ancients believed the blood to contain all the pushing and driving powers of the body and that the soul made a swimming pool of the wonderful red fluid. In imperial Roman days the crowds who thronged to the games often rushed into the arena to drink the blood of dying gladiators. Thus, the Romans believed, they might imbibe lasting draughts of courage and fortitude. On these grounds, too, African natives will eagerly swallow the blood of a dying lion. When Pope Innocent VIII was doddering to his grave in 1492 he received by some rough method of transfusion the blood of three unfortunate youths. If the chroniclers are to be trusted, neither His Holiness nor the boys displayed any active interest in the subsequent religious exercises. But this and other setbacks did not blot out the belief that blood might be transferred directly from the vessels of one man to those of another. One year before Harvey discovered the mechanisms governing the circulation, Libavius described a method (though he may not have practised it) by which blood might be made to run with happy results "from a young man, robust, and full of spirituous blood" into the veins of "an old man, thin, emaciated, his strength exhausted, and hardly able to retain his soul". In 1665 Dr. Richard Lower, a tavern friend of Samuel Pepys, performed the first genuine blood transfusion in England. Using quills, he maintained life in an exsanguinated dog by connecting its jugular vein to the carotid artery of a second animal. Even before this successful work was done, Christopher Wren and Robert Boyle had interested themselves in the subject. In the Franco-Prussian War there arose a fashion for blood transfusion in Germany. Glowing reports were circulated; but there were not a few inexplicable fatalities, and transfusion was shunned when it became clear that the blood of one man might, and often did, clump together or destroy the red cells of another, with fatal results. Such untoward events remained a dark mystery

until Landsteiner, in 1900, proved that the serum of one normal human being can agglutinate or hæmolyse the blood of certain selected individuals—a discovery rewarded with the Nobel Prize. Later, William L. Moss earned fame by his demonstration that a sample of human blood may belong to any one of four defined groups. Such in brief are the steps by which the procedure of blood transfusion has been made safe for the patient. We can now say that though we may not benefit him, we will not kill him.

But, apart from the question of doing harm, we can now tabulate our knowledge; we can state whether transfusion is likely to be beneficial or curative in this case or that, or whether the operation is hardly more than a waste of time. From this aspect the position has been clarified and summarized in concise form by F. A. Knott,[1] late hæmatologist of Guy's Hospital, who has drawn up a useful list of the important indications.

When the modern technique for transfusion was placed on a satisfactory basis, it was widely used to replace blood lost in severe post-hæmorrhagic states. Clinicians found that the introduced blood increased the blood pressure, the rate of flow, and the volume of the pulse. In addition, the hæmopoietic system was given a necessary fillip. It is now held that if the causal hæmorrhage has been only recent and has ceased, transfusion is needless unless the hæmoglobin level has fallen to 25%. If, however, the hæmorrhage is continuous, transfusion is called for when the figure reaches 35%.

It is well known that aplastic anæmia, whether the result of damage by X rays, radium, chemical agents or chronic sepsis, is unlikely to alter (except for the worse) as the result of liver or iron therapy. Here, then, repeated transfusions are to be urged for long periods of time, and all efforts are to be made to maintain the hæmoglobin value at a high level. By such treatment improvement may ensue, even though no cause of the aplasia may be discovered.

Some years ago blood transfusion was almost a routine procedure in the treatment of pernicious anæmia. There is no doubt that the blood count often takes an upward jump as the result of an initial transfusion at the outset of treatment. Apart from this, however, transfusion is now seldom desirable for the control of the disease. Much the same may be said of the pernicious anæmia occurring in pregnancy. This disorder responds to liver treatment; but an anæmia of this type, occurring suddenly just prior to parturition, is often subdued by a timely transfusion.

In anæmia of the hæmolytic variety (for example, acholuric jaundice), in which splenectomy is recommended, the perils of the operation are greatly lessened by a pre-operative dose of transfused blood; and even in cases labelled idiopathic, which appear in adults and children alike, improvement may follow the same treatment. The severe blood disease of infants (once named after von Jaksch) is always associated with rickets, syphilis or tuberculosis, and these conditions require first consideration; nevertheless, transfusion must be performed if the anæmia is of severe degree. In like manner, benefit follows transfusion in the treatment of the hyperchromic anæmia of infants. Life may be saved thus in the acute hæmorrhagic crises which arise in the course of hæmophilia and thrombocytopenia, in the terrible hæmorrhagic disease of the new-born; and it is now recognized that the blood of a donor has enormous value as a prophylactic in hæmophilia, even when such a slight operation as a tooth extraction is under consideration. For the relief of the purpuric and other lesions arising in leuchæmia transfusion is valueless. Similarly, it is useless in those patients suffering from acute infections whose leucocytosis is high and in whom anæmia is not severe. Dramatic improvement has sometimes occurred in cases of septicæmia and pyæmia in which it has been possible to immunize the blood donor to the infection responsible, as also in acute fevers in which the donor's serum contains appropriate antibodies. The same is true of cases in which septic material is suddenly set free (for example, ruptured appendices, perforated duodenal ulcers) and in those forms of gas poisoning (carbon monoxide and cyanide) in which the blood of the patient can no longer act as a vector of oxygen. From this short epitome it is clearly seen that few single methods of treatment have a wider range of application than has blood transfusion; and it is satisfactory to realize that our knowledge of its advantages and limitations now seems to be firmly grounded.

[1] *The Practitioner*, March, 1935.

ENEMATA AND INTESTINAL MOTILITY.

For the relief of post-operative distension of the abdomen enemata of various kinds are used. H. E. Carlson and T. G. Orr point out that the beneficial results of these enemata have been attributed to a reflex stimulation of the small intestine, and they add that proof of this action has not been forthcoming.[1] They report some interesting experiments carried out on dogs. Kymographic tracings were taken after the insertion of rubber balloons into the jejunum and ileum and before, during and after the administration of various types of enema. Enemata of tap water, soap-suds, physiological solution of sodium chloride and a mixture of magnesium sulphate, ox gall, glycerine and water, and injections of air had no demonstrable effect on the motility of the small intestine. The only change from normal tracings occurred when the enemata were being expelled; at this time contraction of the rectus muscle caused compression of the intestine. Hypertonic salt solution caused increased peristalsis. Carlson and Orr therefore find no support for the commonly held view and conclude that enemata should be depended on only to empty the colon.

[1] *Archives of Surgery*, May, 1935.

Abstracts from Current Medical Literature.

THERAPEUTICS.

Bromine.

L.-A. JACOBSON (*La Presse Médicale*, March 20, 1935) discusses the physiological and clinical rôle of the exchange of bromine in the body. The average bromine content of the blood is between one and two milligrammes *per centum*; it is increased in manic-depressive states, in hyperthyreoidism and exophthalmic goitre. Nervousness and sleeplessness become less as the bromine in the blood diminishes. Preparations containing bromine have been administered with benefit in hyperthyreoidism (dibromothyroxine and tetrabromothyroxine). The hypophysis contains a high proportion of bromine comparatively, and Zondek has suggested that the hypophysis produces a hormone containing bromine (tetrabromothyroxine) which induces sleep. Zondek claims to have induced sleep by injecting a watery solution of the hypophysis into animals, and has further stated that the hypophysis controls the thyreoid gland activity partly by means of tetrabromothyroxine.

Chrysotherapy in Chronic Arthritis.

CLOSE observation of one hundred patients with chronic arthritis for a period of five years and their treatment with three preparations of gold has enabled H. S. Pemberton (*The Lancet*, May 4, 1935) to report his findings. The cases selected do not include, as far as is known, any arthritis of specific ætiology; there were no cases of spondylitis in the series. Three types of gold salts have been used: First, sodium aurothiopropanol sulphonate or "Allochrysine", containing about 35% metallic gold, in doses of 1·5 to 2·0 grammes, given either intramuscularly or intravenously in six doses—one a week. Secondly, sodium gold thiosulphate or "Crisalbine" was used; this contains 37% metallic gold and was given in doses of 1·5 to 3·0 grammes intravenously in six doses. Thirdly, "Myocrisine" has been employed; metallic gold is present to the extent of 50%, and up to 2·0 grammes are given intramuscularly in oily suspension in graduated doses over a period of six weeks or more. All of these preparations can give rise to toxic symptoms. While few patients escape without any such effects, in the great majority they are slight. The following list of these phenomena places them in order of frequency: pyrexia, increased periarticular pain or swelling, macular and scarlatiniform rashes, sore tongue, stomatitis, diarrhœa, and lesions of the fingers suggestive of pernio. The dose or type of gold does not seem to bear any relation to the toxic appearances, which may come early and late. Arthritics who, on preliminary investigation, show albuminuria, raised blood urea, poor clearances, or any evidence of liver defect, are not suitable for gold therapy; and in those who exhibit toxic features a halt should be called at once. In not a few of the patients who have been somewhat emaciated there has been increase in well-being and weight, and even in the red cells, long before the arthritis appeared to be in any way affected. Dietetic treatment has been used in certain cases; hydrochloric acid has been administered, if this was lacking, and physiotherapy has followed the course of chrysotherapy. No osteoarthritics were cured, but the improvement that some of them showed was remarkable. Twelve of the patients in the series have been cured, thirty-eight very much improved, thirty-eight improved, and twelve remain the same. No patient has been made worse.

Thevetin.

H. L. ARNOLD, W. S. MIDDLETON AND K. K. CHEN (*The American Journal of the Medical Sciences*, February, 1935) describe the action of thevetin, a glucoside obtained from the plant *Thevetia neriifolia*. This glucoside has been isolated in pure form, and its action has been tested on normal and abnormal hearts. Its action is digitalis-like, being more prompt and less sustained than that drug. Twenty-three patients with heart failure were tested with this drug; it was administered by mouth, intramuscularly and intravenously, 0·5 to 5·0 cat units being given at each dose. The drug is too irritant for intramuscular use. The general effect indicated a therapeutic action and a toxicity equal to one-seventh of that of ouabain.

Mandelic Acid in Urinary Infections.

THE effective factor in the ketogenic diet treatment of chronic urinary tract infection is β-hydroxybutyric acid. The oral administration under normal metabolic conditions is ineffective in the control of urinary infections, owing to its complete oxidation before excretion in the urine. M. L. Rosenheim (*The Lancet*, May 4, 1935) has endeavoured to find a keto-hydroxy acid which combines an effective bacteriostatic power with resistance to oxidation in the body. He tested the bactericidal activity of various acids *in vitro*, using urine as the culture medium and *Bacillus coli* as the experimental organism. The writer gives his results and deduces therefrom that mandelic acid fulfils the theoretical requirements better than any other acid tested. Mandelic acid is a hydroxy acid, non-toxic and excreted unaltered in the urine, which it renders bacteriostatic. The objective in treating patients with this substance has been to obtain a high urine concentration of the acid at a pH favourable to its bacteriostatic action. The routine method adopted has been to give a mixture containing three grammes of the acid in an ounce of water, just neutralized by sodium bicarbonate, approximately 1·6 grammes, and flavoured with lemon, four times daily. Simultaneously the acidity of the urine has been increased by the administration of ammonium chloride, eight cachets, each containing one gramme, being given during the day. The fluid intake is limited to two pints. Mandelic acid is readily soluble in water, and the sodium salt is not unpalatable. A small series of twelve patients has been submitted to the above treatment and the results have been promising. In the successful cases the patients have started to improve after a few days, the clinical improvement being more rapid than the pathological state of the urine, which has become sterile within ten to twenty-one days. There were six cases of pyelitis of pregnancy; urinary obstruction plays an important part here, but four of the patients were definitely improved, one being cured; in one of the two failures the patient was also unrelieved by the ketogenic diet. Of the remaining six patients whose condition was unassociated with pregnancy, all have been clinically improved, while three have been cured. Intermittent therapy is apparently of more value in the resistant cases than a long-continued course of treatment. Casts have been noted in two patients undergoing treatment, and an increase in albuminuria has also been noted in one instance. This suggests caution in the administration of the acid to patients with any renal impairment. Some patients have complained of buzzing in the ears and of temporary deafness.

Oil of Peppermint.

H. I. SAPOZNIK, R. A. ARENS, J. MEYER AND H. NECHELLS (*The Journal of the American Medical Association*, May 18, 1935) record the results of investigations into the action of oil of peppermint on the stomach. From 2 to 100 cubic centimetres of oil of peppermint were injected into the stomach; the emptying time was observed before and after this procedure. It was shown that the addition of two cubic centimetres of oil of peppermint (United States Pharmacopœia) to a barium-milk meal shortened the emptying time of the stomach by 46% (fluoroscopy). The emptying time of the normal stomach was not altered when olive oil or chocolate candy was given instead of oil of peppermint. Peppermint candy and peppermint flavoured alcohol had the same effect in shortening the emptying time of the stomach in one subject.

Black Spider Bite.

J. M. FRAWLEY (*The Journal of the American Medical Association*, May 18, 1935) records the results of treatment in fifty-two cases of black spider bite. Bites occurred on the scrotum,

penis, feet, arm or back. Pain and swelling occurred, followed by cramps, generalized pain, abdominal pain and rigidity, and nausea or vomiting. Anxiety, headache, giddiness and ringing in the ears also occurred. The blood pressure was raised by 30 to 40 millimetres of mercury. Temperature and pulse rate were normal. Treatment consisted in rest in bed, iodine applied to the bite, a soap-suds enema and fluids given freely by mouth. Morphine sulphate was given for the pain, and "Sodium amytal" to insure rest. Twenty cubic centimetres of a 10% solution of magnesium sulphate were injected intravenously. No deaths occurred. The patients were usually symptom-free in twenty-four hours.

NEUROLOGY AND PSYCHIATRY.

Blood Bromine in the Psychoses.

T. J. HENNELLY AND E. D. YATES (*The Journal of Mental Science*, January, 1935) review the literature on blood bromine values in relation to psychotic patients which has received much attention within the last few years. They describe in detail the technique of the method which they themselves employed in making blood bromine estimations in regard to forty-five psychotic and fifteen normal individuals. Six case histories are detailed, and the blood bromine contents are tabulated when estimated at various intervals according to the mental phases through which the patient may have passed. The authors have further studied the physiological basis for variations which have been observed to occur in the blood bromine content of the same individual. These authors found wider variations in the blood bromine of normal females than in normal males. No explanation is given to the fact. They found low values indiscriminately in all types of schizophrenia, in paraphrenia, manic-depressive psychoses and involutional melancholia, while psycho-neurotics and organic dements gave blood bromine values which fell within normal limits. Their work conflicts with that of Zondek and Bier, who found that low blood bromine values were typical of the manic-depressive psychosis. Hennelly and Yates state definitely that their research shows that the estimation of blood bromine is of little value in the differential diagnosis of manic-depressive states, as there was no correlation observed between changes in the mental state and variations in the blood bromine value.

The Treatment of Schizophrenia with Yohimbine.

H. C. BECCLE (*The Journal of Mental Science*, January, 1935) claims to have achieved some success in the treatment of cases of *dementia præcox* by a combination of gonadal hormones and yohimbine. He considers that yohimbine acts as a general central nervous tonic and, apart from any specific effect on the genitalia, appears to enhance the action of the gonadal hormones. Details are given of the clinical history and treatment of thirteen patients. Of the four female patients treated, three recovered and one became worse. Seven of the nine male patients recovered and were discharged from hospital; one improved and one showed no response to the treatment. No untoward symptoms were observed during treatment. A fall in blood phosphorus was noted in those cases in which recovery occurred, and, as the blood phosphorus is generally higher than normal in schizophrenics, this response was recognized as favourable; and the writer claims that it may be used as a guide in controlling treatment.

Rhinorrhœa and Cerebral Neoplasms.

ROBERT E. BRITT (*The Journal of Nervous and Mental Disease*, June, 1935) credits Willis as being the first to report the escaping of cerebrospinal fluid through the nose. There are now about thirty-eight cases of rhinorrhœa recorded in the literature, the majority being secondary to intracranial neoplasms. The present author reports upon ten further cases, with an autopsy on the first. In this instance the patient was a boy, aged sixteen years when he first presented symptoms of cerebral tumour. His clinical history is recorded in detail. At the age of twenty-eight, among other symptoms, he developed rhinorrhœa, which continued for six months until he died from what was later revealed to be a cerebellar tumour of medulloblastoma type. Autopsy revealed thinning of the bones of the skull and erosions of the *lamina cribrosa* as the result of intracranial pressure. The second case was that of a man of twenty-eight years presenting the classical signs and symptoms of a cerebral tumour. Four years after he was first observed, he developed rhinorrhœa and, at the time this report was made, he was losing approximately ten cubic centimetres of fluid a day. The patient refused treatment, so that the nature of the growth could not be determined; but from the symptoms it was presumed to be in the region of the *sella turcica*.

The After-History of Mental Patients.

L. H. WOOTON, R. W. ARMSTRONG AND DOROTHY LILLEY (*The Journal of Mental Science*, January, 1935) have conducted an investigation into the after-histories of psychotic patients discharged from an English mental hospital; and they have grouped the patients into those who have been discharged for one, two, three, four and five years respectively. From this study they found that an isolated attack of some mental disorder in many cases carries with it a favourable prognosis with but little tendency to relapse. The large number of psychotic patients who relapse within three months after discharge from a mental hospital is very often accounted for by the fact that the relatives insist upon removing the patient prematurely, or through lack of judgement on the part of the medical staff. In certain cases the patient, although recovered and well while in hospital, does not possess the stability or ability to adapt himself to an environment based upon the competitive struggle for a livelihood. The authors find that there is a danger period, occurring about a year after discharge, at which time a number of recurrences occur, and that the likelihood of recurrence tends to disappear progressively after this period, except in the case of schizophrenics. These authors were impressed by the number of apparently typical schizophrenic patients who remained well after discharge and who, some years later, showed no evidence of the *præcox* attitude. They question the importance of pregnancy and the puerperium as precipitating factors in causing recurrent attacks in patients discharged as cured from mental hospitals; and they stress the need for some properly organized follow-up system as a means of safeguarding patients who have been discharged and of minimizing their liability to relapse.

Treatment of Spasmodic Torticollis.

JOSEPH C. YASKIN (*The Journal of Nervous and Mental Disease*, March, 1935) reviews the literature concerning spasmodic torticollis, and casts a doubt on the validity of the older viewpoint that this condition was one which presented a neurosurgical problem. He believes that there are some cases which have a definite organic basis, resulting from brain diseases, lesions of the cervical vertebræ or focal infections, but the majority are of psychogenic origin. He thinks that affected persons should be studied and treated by a psychiatrist before being brought under the notice of the surgeon. A case is reported in detail of a male, aged thirty-four years, who developed a spasmodic torticollis following a motor accident and reverses in business. The physical and neurological examinations revealed no abnormality. He was later admitted to hospital, where he underwent a partial psychoanalysis with considerable benefit to his torticollis. Faulty psycho-sexual development was found to be the underlying cause of his trouble, and even partial resolution of the underlying conflict brought about a temporary recovery. The author is of the opinion that the hyperkinesis is a symbolic expression of an intrapsychic conflict which can be resolved only by modern psychotherapy; and he makes a strong plea, supported by critical references to the literature, for a careful psychological investigation of all cases of spasmodic torticollis before the less promising and generally less successful methods of the surgeon are adopted.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at Ballarat on June 15, 1935, DR. R. M. DOWNES, the President, in the chair.

Appendicitis.

DR. A. J. TRINCA read a paper entitled: "Some Points in the Treatment of Appendicitis" (see page 308).

DR. W. T. GREENING asked Dr. Trinca whether he thought that jejunostomy or ileostomy should be done as a prophylactic measure against ileus at the time when a severely perforated appendix was found at operation. A good prophylactic point that Dr. Trinca had mentioned was the desirability for a minimal amount of handling of the bowel. Dr. Greening also agreed with Dr. Trinca that all unnecessary trauma of the abdominal wall should be avoided. Before making the incision through the transversalis muscle he liked to make a small opening in the rectus sheath first and to do a little blunt dissection with artery forceps. He did not hesitate to put in a retractor frame at once if he encountered difficulty in getting a good exposure.

DR. N. A. LONGDEN said that he had been helped by Wilkie's description of acute obstructive appendicitis, but it was difficult to recognize cases unerringly because of the way in which a gangrenous state was reached without the occurrence of fever or a dirty tongue. In the Ballarat Hospital he thought that in 10% to 12% of operations for appendicitis drainage was used. Drainage was still used too often. He had not encountered one case of subphrenic or pelvic abscess or an example of post-operative obstruction while the patient was in the hospital.

DR. W. SLOSS stated that he had found examples in which the blood vessels had been obliterated, but in what he estimated to be at least 2% of cases the caecum had been involved for two or three inches. At times when he had not used drainage he had found it necessary to reopen the abdomen. Now, when he was in doubt, he inserted a drain through a separate stab wound placed laterally.

DR. LESLIE HURLEY criticized a number of the statements that Dr. Trinca had made in his paper. He thought that it was far from being established that acute appendicitis had not existed until modern times. Dietetic errors were more frequent than examples of acute appendicitis. Such conditions as coronary thrombosis and subacute bacterial endocarditis had been put on the map recently but were not on that account proved to be of recent origin. The incidence of appendicitis was greatest at the age periods of greatest growth of lymphoid tissue, and the appendix was prone to inflammation in line with other lymphoid tissue. Tonsillitis did not spread. The comparatively poorer vascular supply would explain why inflammatory changes affected the appendix predominantly. The number of organisms obtained on culture was no criterion; the virulence of the organisms isolated was the crucial test. It was readily possible to get evidence of fully developed acute inflammatory changes in appendicitis within a few hours of the onset.

DR. G. A. PENINGTON said that his brother had informed him that, though the natives in New Guinea were difficult to get under treatment in a European hospital, and therefore the records of such a hospital would not be a reliable guide, appendicitis did occur among them.

DR. A. P. DERHAM, while not wishing to comment on the subject matter of Dr. Trinca's paper, felt that it was not wise to be dogmatic to students and resident medical officers on the question of drainage. He had no doubt that a surgeon of Dr. Trinca's experience would exercise intuitive judgement that would make the doctrine safe for his patients; but this surgical judgement came only through ripe experience, and perhaps the junior surgeon might be safer if he sometimes used drainage.

DR. VICTOR HURLEY felt that the matter warranted further investigation. He was sure that there were many ætiological factors at work in appendicitis, and he would certainly include those mentioned by Dr. Trinca. They should remember that no patients died of appendicitis; it was the sequelæ that caused the deaths. He instanced peritonitis and intestinal complications. He was satisfied to remove the original cause—the appendix—and when in doubt he drained the peritoneal cavity. Drainage aided the escape of the toxic products which were responsible for severe symptoms.

DR. R. M. DOWNES thanked Dr. Trinca for his stimulating and provocative address. On such questions as whether to operate or to watch, and whether to drain or close the abdomen, surgeons doing a lot of appendiceal operations would not be influenced by the opinion of any one man; but for the general practitioner who was not often called on to operate, the best advice, in his opinion, was to operate on diagnosis and, when in doubt, to use drainage.

Dr. Trinca, in reply to Dr. Greening, stated that jejunostomy would drain only one or two loops of bowel and would not therefore be dependable in a case with ileus He had used it in desperate cases without success and had abandoned the procedure in favour of what he considered was a more rational treatment of peritonitis. When a larger opening was desired, he thought that the incision in the rectus sheath was a good point, and he did it himself, retracting the transversalis muscle inwards before opening the abdomen. On the other hand, it had the disadvantage of opening up another tissue plane for the possible spread of sepsis. In reply to Dr. Longden, he thought that in apparently subsiding cases no harm would be done by waiting. After all, the mortality was less than 1% in the first twenty-four hours and less than 2% in the second. He asked if much fluid had been seen to escape from a drainage tube. He asked everybody that. He knew that when the tube was withdrawn there was a gush of fluid, which he thought was a reaction to a foreign body in the shape of a tube. In reply to Dr. Sloss, he mentioned that the portion of the caecum near the base, when involved, became involved when it was dependent for its blood supply on the proximal branch of the appendiceal artery. On the question of drainage he had no doubts. His advice was: "Do not drain if the primary focus has been completely removed." He could not understand the attitude of the surgeon who was prepared to follow the Ochsner-Sherren treatment in peritonitis in the hope that fluid would absorb or become localized, even in the presence of a primary focus, and who would yet attempt to remove that fluid in other cases by the drainage tube because of its supposed toxicity when the primary focus had been removed.

In reply to Dr. Leslie Hurley, Dr. Trinca said there could be no comparison between tonsillitis and appendicitis simply because both contained lymphoid tissue. Tonsillitis was an inflammation of lymphoid tissue, not of a mucous membrane. Appendicitis was an involvement of the surface epithelium of the appendix or of all the coats by a pathological process, and there was no selective attack on the lymphoid tissue. With regard to the statement that the appendix was poorly supplied with blood, Dr. Trinca stated that when the appendix had a well developed mesentery it had a rich blood supply and was better supplied than the caecum.

Therapeutic Abortion.

DR. W. R. GRIFFITHS read a paper entitled: "Therapeutic Abortion" (see page 311).

DR. NORMAN ALBISTON drew attention to the subconscious process which perpetuated the damage when a person was in receipt of compensation for an injury under the *Workers' Compensation Act*, and thought that there might be a psychiatric aspect of the question of therapeutic abortion. The emotional history and background should be taken into account before it was decided that the symptoms called for operative interference.

DR. G. A. PENINGTON asked Dr. Griffiths a question about tuberculosis and pregnancy. It was recognized that an improvement was likely to occur in the patient's condition if she became pregnant, but that she was liable to a serious relapse after the confinement if the pregnancy terminated normally. Dr. Penington wanted to know whether Dr. Griffiths had formed an opinion as to how far the pregnancy could be allowed to proceed to get the beneficial effect and yet be terminated sufficiently early to avoid the undesirable after-effects.

In reply to Dr. Albiston, Dr. Griffiths thought that he was reputed to be a hard man to persuade to do a therapeutic abortion operation without very definite organic grounds for interference.

In reply to Dr. Penington, Dr. Griffiths said that he thought a woman with tuberculosis should have therapeutic abortion performed at about the fourteenth week of pregnancy. If the opportunity for this treatment had passed, it was better to allow her to go on to term, as interference later than the fourteenth week was, in his opinion, more hazardous than the continuation of the pregnancy.

NOMINATIONS AND ELECTIONS.

THE undermentioned has been nominated for election as a member of the New South Wales Branch of the British Medical Association:

Drummond, Malcolm Thomas, M.B., B.S., 1933 (Univ. Sydney), The Women's Hospital, Crown Street, Sydney.

Medical Societies.

THE MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, on June 12, 1935, Dr. J. G. WHITAKER, the President, in the chair. The meeting took the form of a series of clinical demonstrations.

Murk Jansen Bone Dystrophy.

DR. H. DOUGLAS STEPHENS showed a boy of four and a half years, admitted to hospital five weeks previously with the history that for the past nine months he had had pains and aches in both legs on walking. He was unable to walk long distances and the mother had lately noticed him becoming very knock-kneed. He was the fourth child in the family, all the others being normal. He had been a healthy baby, weighing 4·05 kilograms (nine pounds) at birth, and had had no serious illness till he was two years of age, when he had pneumonia. Seven months ago he had scarlet fever and was ill for six weeks. Examination of his osseous system showed that the upper ends of both tibiæ were flattened antero-posteriorly and much widened laterally, giving him an appearance of marked *genu valgum*. There were similar symmetrical changes at the ends of the other bones, especially the radii, the femora and the ribs. All his other systems were normal. His blood had not reacted to the Wassermann test. His blood calcium and phosphorus content were normal. The radiologist's report on the long bones was that examination revealed a symmetrical bony dystrophy involving upper and lower limbs, not corresponding to any well defined dystrophy, such as Ollier's disease, diaphyseal aclasis or achondroplasia.

Dr. Stephens said he showed the condition as a fairly rare type of bone dystrophy described by Murk Jansen in the "Robert Jones Birthday Volume". The condition usually affected the four limbs symmetrically and was characterized by irregular bone formation in the region of the metaphysis. The diaphysis enlarged, causing the deformity. The ætiology was unknown. It was not due to rickets, but was probably congenital in origin. Treatment other than orthopædic measures for the deformities was of no avail. In this particular case the process seemed to have become arrested.

Unilateral Bronchiectasis.

DR. CLIVE FITTS showed a girl of twelve years with the history that she had had a cough for many years, becoming worse recently. Occasionally she coughed up a large amount of sputum which was thick and yellow. There was no history of hæmoptysis. Recently she had lost some weight. In her early childhood she had had measles and whooping cough and several attacks of bronchitis. Her tonsils and adenoids had been removed six years previously. The family history was irrelevant. Examination revealed a thin pallid child, tall for her years. There were coarse râles at the base of the left lung. The fingers were not clubbed. General examination otherwise revealed no abnormality. X ray examination of the nasal accessory sinuses revealed a condition of chronic sinusitis, and of the chest, a condition suggesting bronchiectasis at the left base. Further films of the chest after lipiodol injection confirmed the fact that there was bronchiectasis in the lower lobe of the left lung. The right lung was normal. At the present time her sputum amounted only to a few drachms per day. It contained no tubercule bacilli. Her blood sedimentation rate was normal. The treatment instituted so far consisted of continuous postural drainage on a special bed and of appropriate treatment for her sinusitis.

Dr. Fitts showed the patient because she illustrated many points in the diagnosis and treatment of bronchiectasis. First, there was the relationship of sinusitis to bronchiectasis. If this were admitted or advanced as the principal cause, why should the disease be unilateral? It seemed to indicate that the principal cause was to be found in the lung itself and not in the infected sinuses. Secondly, there was the question of bronchoscopic aspiration. He thought that its chief use was palliative only. It acted for only a short time at infrequent intervals. Thirdly, what further treatment should be considered? He thought that this must be decided on the progress made by the patient. A review of her condition, including further lipiodol injections, in about six months' time should be made. If she appeared to be improving then the present treatment could be continued indefinitely. If further treatment should be necessary, the possible measures were artificial pneumothorax, phrenic avulsion or lobectomy. Dr. Fitts did not think that pneumothorax and phrenic avulsion were of any lasting value. They seemed to help a little, but the bronchi did not collapse. He thought that lobectomy might seriously be considered here. The child was of a good age and the disease was confined to one lobe.

Synovial Form of Infective Arthritis.

DR. ERIC PRICE showed a boy of four years with a history that seven months previously he had twisted his left ankle, not severely enough to keep him off his feet, but the ankle swelled; and although the swelling subsided later, it had recurred off and on since. Six weeks after the onset the ankle was examined by X rays, but no abnormality was detected, although there was marked swelling around the joint. The spleen was palpable, but the patient had a pharyngitis at the time. The spleen was not palpable now. Two months later the swelling was still present. The ankle was slightly hot with some tenderness on the medial side. The movements were fairly free. Estimation of the sedimentation rate of the patient's red corpuscles revealed a quiescent type of curve. There was no reaction to the Mantoux test. Two and a half cubic centimetres of turbid fluid were aspirated containing numerous polymorphonuclear cells. A smear revealed a small number of Gram-positive diplococci which did not grow on culture. The patient was placed in plaster for six weeks, when the swelling subsided, but within a week of removing the plaster the swelling and limp recurred. Another X ray examination then revealed periarticular thickening, but no bony change. A further five cubic

centimetres of blood-stained fluid were aspirated and the leg was placed in plaster for six weeks. The plaster was then removed, but within a week the condition again recurred. The patient was then admitted to hospital and the fluid was fairly quickly absorbed. At the time of the meeting there was much periarticular swelling with slight limitation of dorsiflexion. There was still no reaction to the Mantoux test. The patient's blood did not react to the Wassermann test. His sedimentation rate estimation still revealed a quiescent type of curve. There was a slight afternoon rise in the patient's temperature. X ray examination still revealed no bony damage at all.

Dr. Price showed the patient as providing an example of a chronic infective type of synovitis. He said that American writers recognized this synovial form of infective arthritis. The patients had less pain than when the bones were involved, and usually they responded well to immobilization, a good useful joint resulting.

Congenital Syphilis.

DR. JOHN HEATH showed two patients suffering from congenital syphilis, in order to emphasize some special points about two common signs, namely, interstitial keratitis and Hutchinson's teeth. The first patient was a boy, aged nine years, who had attended rather late for an acute interstitial keratitis accompanied by Clutton's joints. The patient was presented to show the necessity for the early diagnosis of this condition and the necessity for immediate and bold treatment. Local treatment consisted in the instillation of 1% atropine drops twice a day to keep the pupils dilated, and the disabling photophobia was relieved by darkened glasses. Potassium iodide was given orally, the dosage being 1·8 grammes (thirty grains) three times a day, and intramuscular injections of "Metarsenobillon" were given, 0·45 gramme once a week. Treatment had been maintained for six months and great improvement had followed, but owing to the relatively late stage at which the patient was first seen there was synechial adhesion due to iritis in the left eye, and some permanent interference with vision due to fibrotic changes in the cornea.

Dr. Heath said that only 22% of congenitally syphilitic children had normal eyes. Interstitial keratitis was often thought to be a simple conjunctivitis, and it was important to look for stippling of the cornea in the early stages. It was commoner in girls than boys, and was frequently associated with iritis too. It might even appear in those undergoing treatment. In the very early stage the stippling could be seen only with a hand lens.

The second patient was a girl, eight years old, with typical Hutchinson's teeth, the interesting fact being that treatment was instituted before the teeth had erupted, but they still retained their classic structure. Dr. Heath pointed out that there was some confusion as regards the description of the teeth, as originally set out by Hutchinson, that the notch was essentially more on the anterior surface of the lower pole than on the biting edge, and that such teeth existed in about 25% of all cases. The other features were the converging sides and the antero-posterior thickening. These teeth could often be recognized radiologically before they had erupted, but treatment even then was of no avail.

Medical Practice.

THE ADELAIDE RADIOTHERAPY CLINIC.

THE following is the second circular issued from the Radiotherapy Clinic at the Adelaide Hospital.

A MEETING of the Adelaide Hospital Radiotherapy Clinic was held on April 19, 1935. Cancer of the uterus was discussed. A précis of recent literature on the subject was read and the position in Adelaide was compared with that obtaining in other centres. The following is an abstract of the evening's proceedings.

CARCINOMA OF THE CERVIX UTERI.

Recent Literature.

Where the words "cure" or "survival rate" are mentioned it is to be understood that the period covered is five years unless otherwise stated.

In 1929 a subcommission of the League of Nations Health Commission drew up a classification of the stages of carcinoma of the *cervix uteri* on an anatomical basis. Briefly, the following four stages are recognized:

Stage I: The growth is confined to the cervix.

Stage II: Infiltration into one or more fornices has occurred, but the mobility of the uterus is not abolished.

Stage III: There is infiltration of both lateral fornices with fixation of the uterus or involvement of the vaginal walls or bladder.

Stage IV: Extensive infiltration ("frozen pelvis") or distant metastatic deposits.

Obviously the radiologist, in distinction from the surgeon, does not have the opportunity of examining directly the affected organs, so that some such classification is essential if results from various clinics are to be compared. Unfortunately very few surgeons classify their cases in this way, most adopting a scheme based on a personal view of operability, so that comparison between the statistics from radiation and surgical clinics is rendered difficult. Discussions, such as that between Faure, the French Bonney, and Regaud, the Director of the Paris Radium Institute, are rendered valueless by this unfortunate difference in classification.

Surgery.

Surgical treatment can cure a high percentage of patients when the lesion is in a favourable stage. Bonney estimates that his operability rate is 63% in the hospital class and 82% among the private patients. It must be remembered, however, that in the vast majority of cases a certain amount of selection is performed by the general practitioners who carry out the first examination on such patients, so that this does not represent the true operability rate in all sufferers from carcinoma of the cervix. Recent figures from the University Clinic of Berlin give an operability rate of just over 40%. The operation required is drastic and dangerous, even in the hands of a specially trained surgeon. Primary mortality in the Berlin clinic is 14%. Bonney's operative mortality rate is 15% over a period of years, but improvement is shown with experience.

In his first 100 operations 20% of patients died as a direct effect of the surgical intervention, whereas only 9% died from that cause among the last 100 (he analysed 428 cases). He remarks that the latter percentage is below that following prostatectomy.

Results.—Of patients treated by Bonney, 39% survive for five years. Cases in which the regional lymph glands were not involved gave a cure rate of 50%. In the University Clinic of Berlin 423 patients were submitted to Wertheim's operation between 1913 and 1925; 49% of these survive. Some of the latter received X radiation after the operation.

Radiation Therapy.

In a number of big centres radiation therapy has largely replaced surgery in the treatment of cervical carcinoma. At the gynæcological clinic of the University of Munich 2,203 patients suffering from this disease have been treated since 1913 and all have received radiotherapy as the sole treatment. Practically no patient with cancer of the cervix has been treated surgically in Sweden since 1919. Other centres report similarly large numbers.

Radiation technique varies somewhat in the different large centres, but each centre has evolved its own standard. To procure comparable results other therapists must follow the standard method entirely—the "occasional radiologist" can no more obtain a satisfactory proportion

of cures than can the "occasional surgeon". Radium is very rarely used alone, but is combined with high voltage X ray therapy. In the earlier days of the Radium Institute at Paris radium was used alone; at a later stage X ray therapy was added for the more advanced cases, but now every patient receives radium together with external irradiation, either from a high voltage X ray plant or from a radium bomb. With this alteration in technique has gone a steady improvement in results. In some clinics the X ray therapy is regarded as actually the principal, with radium as a subsidiary, treatment. Radiation therapy has a definite advantage in that mortality as a direct result of it claims less than 1% of patients.

Results.—In Paris the absolute cure rate for the four years ending 1922 was 17%, whereas for the next four years it was 33%. Such a figure cannot fairly be compared with a similar figure from a surgical clinic, as a high proportion of advanced cases is referred to a radiological centre. During the years 1923 to 1926, 317 patients were treated with the results shown in Table I.

TABLE I.

Number Treated.	Stage I.			Stage II.			Stage III.		
	Treated.	Cured.	Percentage.	Treated.	Cured.	Percentage.	Treated.	Cured.	Percentage.
317	22	19	86	96	41	42	152	46	30

Stages I and II combined (probably the operable group) give a cure rate of 51%.

The five-year results obtained at Stockholm by radiotherapy in cancer of the cervix are shown in Table II.

TABLE II.

Period.	Stage.	Number Treated.	Alive and Well.	Percentage.
1914 to 1923	Operable.	188	76	40
1914 to 1923	Borderline or inoperable.	549	88	16

In a new science such as radiotherapy it is obvious that improvements in technique are taking place. It is somewhat unfair, then, to cover such a period as is contained in the above table; it would be preferable to divide this time into two periods and thus show in statistics the effects of alterations in technique. This was done by Professor Regaud, who found his absolute cure rate improving from 17% to 33%.

Combined Methods of Treatment.

Where surgery is still practised as the main treatment, the operation is commonly followed by a course of high voltage X ray therapy.

In various centres a course of radium treatment is being followed by a Wertheim's operation. This plan was tried in Paris and abandoned in 1920, but with more modern application of radium might show results. A sharp fall in the primary mortality is caused by the healing of ulceration and consequent improvement in pyogenic infection. The method has not been tried sufficiently long to enable five-year figures to be obtained.

CARCINOMA OF THE BODY OF THE UTERUS.

Several radiotherapeutic centres treat carcinoma of the body of the uterus, the Munich clinic claiming 66% of cures in operable cases. Regaud regards carcinoma of the corpus as being, with sarcoma of the uterus, entirely the province of the surgeon. Wintz, treating his patients solely with X rays, showed a cure rate of 50·5% for the years 1921 to 1926. The consensus of opinion is that patients with cancer of the uterine body should have the benefit of an operation.

THE POSITION IN THE ADELAIDE HOSPITAL.

Carcinoma of the Cervix Uteri.

A very small percentage of patients suffering from carcinoma of the cervix present themselves with the disease in an operable stage, so that practically all in the past five years have been treated radiologically. Patients treated solely by radiotherapy at least three years ago show the following results (Table III).

It has been proved in centres where such treatment has been employed for a number of years that only a small proportion of patients who have survived for three years after their treatment died from the disease, so that the figures in the table are not altogether unsatisfactory. They are particularly satisfactory when it is realized that the Adelaide Hospital began with a rather unfortunate technique and one which has since been discarded. We now adopt the technique of the Paris Radium Institute, following radium treatment with a course of high voltage X ray therapy three weeks later.

TABLE III.

Stage.	Number Treated.	Alive.	Percentage.
I	3	2	67
II	9	5	56
III	19	7	37
IV	6	0	0

As a result of this evening's discussion certain minor modifications in our technique were suggested, designed to make a slight increase in the dose of radium and towards cleaning up infection, particularly streptococcal, when present. The rather encouraging immediate results claimed for the combined method of applying radium and then performing a Wertheim operation four weeks later have suggested to us that such a course might profitably be employed, particularly in the earlier lesions. It is certain, however, that no case of this disease will be treated without the application of radiotherapy in some form, and the great majority will be treated by radiation methods alone.

Carcinoma of the Corpus Uteri.

Carcinoma of the body of the uterus has been so well treated surgically that we can see no reason for substituting radiological methods as a routine. The fact that radiological methods alone can give good results suggests that post-operative high voltage X ray treatment would be advisable in every case. Any patient whose general health suggested that panhysterectomy would be attended with an abnormal risk might justifiably be treated solely by radiological means.

Correspondence.

WHOOPING COUGH AND VACCINE TREATMENT.

SIR: Adverting to Dr. H. L. Murray's letter under the above heading in the journal of August 10, I would like to say that I have also re-read, with considerable interest, the article referred to. (Dr. I. Blaubaum, THE MEDICAL JOURNAL OF AUSTRALIA, April 6, 1935, page 432, "Whooping Cough, with Particular Reference to Pertussis Vaccine".) The article had appealed to me as being one of the most informative appearing on this interesting subject in recent journals and I am inclined to think that Dr. Murray, although his statements are literally and scientifically correct, has been somewhat hypercritical in his comments, for it is obvious from the apologetically phrased penultimate paragraph of Dr. Blaubaum's article that he makes no claims to the production of a scientific symposium.

The clinical course and manifestations of pertussis are, no doubt, subject to some degree of change and modification as a result of seasonal, climatic and other factors, but I submit that we are sufficiently familiar with the usual aspects of the disease to render it unnecessary to withhold from large numbers of sufferers the only form of therapy which gives any appreciable measure of relief from symptoms and protection from complications. My experience in the use of vaccine therapy in several small epidemics of pertussis has left such a favourable impression that I have come to regard the administration of this vaccine in almost the same light as the antitoxin therapy of diphtheria, in which field even the most scientifically minded critic would not class as "unscientific" a report which failed to provide untreated control cases.

An important point brought out and stressed in Dr. Blaubaum's paper is the necessity for large doses of vaccine, and I feel sure that it is the disregard of this factor and the inadequate dosage administered which have been responsible for the disappointing results and consequent lack of enthusiasm for this mode of treatment in some quarters.

I am prompted to state briefly my experiences in the most recent epidemic of pertussis in this district occurring during last November, December and January, when vaccine treatment was given to eighty cases, thirty of these being under two years of age. With the exception of bronchitis, which is to be regarded as an accompaniment of the disease rather than a complication, there were no major complications whatever in this series of vaccine-treated patients. In six cases of robust children in whom the spasmodic stage had already been in evidence for several weeks when first seen, injections were not considered to be indicated. During this epidemic weather conditions were warm, dry and, without doubt, favourable for any disease of the respiratory system. Nevertheless, amongst the unknown but probably small number who received home remedies, four children were first seen when complications had developed. Of these, two were cases of bronchopneumonia in sturdy children eight years of age, and two others suffered from sub-conjunctival hæmorrhage.

The scheme of dosage employed was more intensive than that usually advocated. Infants under two years were given the equivalent of 500 million organisms and the dose was doubled every second or third day in the absence of severe reactions, 4,000 million being usually reached at the fourth injection. Older children and adults received 1,000 million bacilli as a first dose, followed by doses of 2,000, 4,000, 6,000, and a fifth dose of 7,000 or 8,000 million in obstinate cases.

In addition, most cases of all ages received an added fractional dose of mixed pertussis vaccine at every alternate injection. Commonwealth Serum Laboratories' vaccines were employed without exception. As examples of this posology two cases are quoted.

(1) Baby, aged six months, weight 13 pounds, had suffered from severe cough and spasms with frequent vomiting for five days; twelve attacks per night. November 22, *Bacillus pertussis* vaccine 500 million; November 24, *Bacillus pertussis* vaccine 1,000 million *plus* 0·1 cubic centimetre mixed (*b*); November 26, *Bacillus pertussis* vaccine 2,000 million; November 29, *Bacillus pertussis* vaccine 4,000 million *plus* 0·1 cubic centimetre mixed (*c*). No vomiting occurred after November 26. On December 1 the number of nocturnal attacks were reduced to 2 to 3 per night. Weight, 13 pounds 3 ounces.

(2) Male child, four years. Incipient pertussis one day. December 6, *Bacillus pertussis* 1,000 million; December 8, *Bacillus pertussis* 2,000 million *plus* 0·2 cubic centimetre mixed (*B*); December 10, *Bacillus pertussis* 4,000 million; December 13, *Bacillus pertussis* 6,000 million *plus* 0·2 cubic centimetre mixed (*C*). Result: termination of spasmodic stage on December 16.

Reactions were never very severe, the most marked following the injections containing mixed pertussis vaccine. It was noted that the formula of this last-named product is not well adapted for the administration of large doses of pertussis vaccine, owing to the disproportionate local and general reactions caused by the other constituents.

It is to be regretted that more has not been written regarding the important question of prophylaxis in pertussis. In general practice it is impossible to obtain a sufficiently large number of cases from which to draw conclusions, but I venture to suggest that success in this field is likely to follow the use of larger doses of *Bacillus pertussis* vaccine (*vide* "The Medical Annual", 1934, page 531).

Yours, etc.,

A. G. S. COOPER.

Denman,
New South Wales,
August 19, 1935.

THE CYCLIC VOMITING SYNDROME.

SIR: From the summary of Dr. Dods's article published in THE MEDICAL JOURNAL OF AUSTRALIA dated August 24, 1935, one gathers that the syndrome of cyclic vomiting is, in his opinion, a metabolic disturbance which is precipitated by emotional stress and physical exhaustion.

As over-exertion is a common symptom of the most widespread psychoneurosis occurring in children, the possibility should be considered that physical exhaustion may not be causal but secondary. Whether the metabolic disturbance itself may not be the result of emotional stress is also a point worth investigating, though this term should cover considerably more than overt disturbances such as those associated with parental over-excitability.

The obvious way to investigate these possibilities is for patients to undergo psycho-analysis (according to the technique of child-analysis adopted by the British Psycho-Analytical Society).

Such a therapeutic test would be suggestive if improvement resulted in an individual patient, convincing if the syndrome were abolished, and conclusive if the latter result was repeated in a large number of cases.

Yours, etc.,

R. C. WINN.

"Harley",
143, Macquarie Street,
Sydney,
August 23, 1935.

SCHILDER'S DISEASE.

SIR: Your correspondent Dr. A. W. D'Ombrain, in his comments in your issue of August 24, 1935, on the case history of the patient described in my recent article on Schilder's disease, has questioned the ocular findings recorded. I wish to make it clear that the record of visual acuity $^{6}/_{\infty}$ had reference to the condition observed shortly

after the onset of his illness in December, 1933, as reported to me by Dr. Sender. The patient's vision had depreciated progressively, as correctly stated by Dr. D'Ombrain, and the child was practically, if not totally, blind during the later phases of his disease.

It is regretted that the wording of my communication should have failed to make the facts sufficiently clear.

Yours, etc.,
A. HOLMES À COURT.

B.M.A. House,
135, Macquarie Street,
Sydney,
August 25, 1935.

Congresses.

THIRD INTERNATIONAL CONGRESS OF SPECIALISTS FOR THROAT, NOSE AND EAR DISEASES.

THE Commonwealth Director-General of Health, Dr. J. H. L. Cumpston, has received advice through diplomatic channels of the Third International Congress of Specialists for Throat, Nose and Ear Diseases, which will be held in Berlin from August 17 to 20, 1936. The following have been chosen as the principal subjects for discussion: (i) Radiotherapy treatment of malignant laryngo-rhinological tumours. (ii) Electro-acoustic apparatus for the testing and improvement of hearing. (iii) The influence of the constitution on diseases of the throat, nose and ear.

Other scientific problems relative to the treatment of these special diseases will be discussed. Previous international congresses have attracted representative gatherings of specialists from many countries, the first congress having been held at Copenhagen in 1928, and the second at Madrid in 1932. The third congress will coincide with the conclusion of the 1936 Olympic Games in Berlin.

Research.

THE WILLIAM GIBSON RESEARCH SCHOLARSHIP.

THE Royal Society of Medicine has announced that the William Gibson Research Scholarship for Medical Women has been awarded to Dr. F. Stephen-Lewis, of the University of Witwatersrand, Johannesburg. Dr. Stephen-Lewis proposes to carry out research on "Further Study in the Chemistry of South African Plants, Particularly those Used by Natives as Medicines", and "Investigations of Physiological Data for the Various Native Tribes".

Naval, Military and Air Force.

PROMOTION.

THE undermentioned promotion in the Australian Military Forces has been promulgated in the *Commonwealth of Australia Gazette*, Number 44, of August 22, 1935.

Australian Army Medical Corps (Permanent).—To be Major-General—Colonel R. M. Downes, C.M.G., V.D., 1st August, 1935.—(Ex. Mins. Nos. 196 and 197.)

NOTICE.

The President (Colonel R. Fowler) and members of the Australian Army Medical Corps Officers' Mess are inviting their friends to meet service and ex-service members of the British Medical Association from overseas at a ball in the Melbourne Town Hall on Friday, September 13, 1935.

The arrangements are in the hands of officers representing the Navy, Army and Air Force Medical Services, namely, Colonel R. Fowler, O.B.E., V.D., D.D.M.S., Third Military District; Major-General R. H. Fetherston, V.D., A.A.M.C., R.L.; Surgeon Captain W. J. Carr, D.N.M.S., R.A.N.; Lieutenant-Colonel W. W. S. Johnston, D.S.O., M.C.; Major H. G. Furnell, Honorary Secretary; Major J. S. Tait; Flight Lieutenant J. Swift; Captain J. P. Major.

The overseas visitors will be in Melbourne on the occasion of the first annual meeting of the British Medical Association to be held in Australia, and the function will permit of the reunion of service comrades from the United Kingdom and all dominions.

THE STAWELL MEMORIAL FUND.

THE undermentioned subscriptions have been received for the Stawell Memorial Fund:

£10 10s.: H. B. Devine.
£5 5s.: J. and A. Anderson, C. B. Blackburn, J. F. Chambers, R. W. Chambers, H. F. Maudsley.
£3 3s.: R. H. Morrison.
£2 2s.: M. D. O'Sullivan, Victorian Medical Women's Society.
£1 1s.: P. H. Liddle, Harvey Sutton, Reginald Howden, L. B. Cox, Oliver Latham, F. R. Legge.

Books Received.

SPEECH IN CHILDHOOD: ITS DEVELOPMENT AND DISORDERS, by G. Seth, M.A., B.Ed., Ph.D., and D. Guthrie, M.D., F.R.C.S.E., F.R.S.E.; 1935. London: Humphroy Milford (Oxford University Press). Demy 8vo., pp. 234, with illustrations. Price: 10s. 6d. net.

BLOOD GROUPS AND BLOOD TRANSFUSION, by A. S. Wiener, A.B., M.D.; 1935. London: Baillière, Tindall and Cox. Super royal 8vo., pp. 234, with illustrations. Price: 18s. net.

FORENSIC MEDICINE: A TEXT-BOOK FOR STUDENTS AND A GUIDE FOR THE PRACTITIONER, by D. Kerr, M.D., F.R.C.P.E., D.P.H.; 1935. London: A. and C. Black, Limited. Demy 8vo., pp. 321, with illustrations. Price: 15s. net.

BACKACHE, by J. Mennell, M.A., M.D., B.C.; Second Edition; 1935. London: J. and A. Churchill, Limited. Demy 8vo., pp. 237, with illustrations. Price: 10s. 6d. net.

CLINICAL PATHOLOGY AND THE TECHNIQUE OF COLLECTING SPECIMENS, by W. Smith, M.A., M.D., B.Chir.; 1935. London: J. and A. Churchill, Limited. Demy 8vo., pp. 164, with illustrations. Price: 5s. net.

HUMAN PHYSIOLOGY, by F. R. Winton, M.D., and L. E. Bayliss, Ph.D., with foreword by C. Lovatt Evans, D.Sc., F.R.C.P., F.R.S.; Second Edition; 1935. London: J. and A. Churchill. Royal 8vo., pp. 643, with illustrations. Price: 15s. net.

SHORT WAVE THERAPY: THE MEDICAL USES OF ELECTRICAL HIGH FREQUENCIES, by E. Schliephake, translated by R. K. Brown, B.A., M.D., D.P.H., with foreword by E. P. Cumberbatch; 1935. London: The Actinic Press, Limited. Royal 8vo., pp. 238, with illustrations. Price: 21s. net.

THEORY AND PRACTICE OF NURSING, by M. A. Gullan, S.R.N.; Fourth Edition; 1935. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. 274, with illustrations. Price: 9s. net.

FAILURE OF THE CIRCULATION, by T. R. Harrison, M.D.; 1935. London: Baillière, Tindall and Cox. Royal 8vo., pp. 377, with illustrations. Price: 20s. net.

CATECHISM SERIES: ANATOMY (THE THORAX), by C. R. Whittaker, F.R.C.S.E., F.R.S.E.; Fourth Edition. Edinburgh: E. and S. Livingstone. Crown 8vo., pp. 59. Price: 1s. 6d. net.

AN INTRODUCTION TO COMPARATIVE ZOOLOGY: A TEXT-BOOK FOR MEDICAL AND SCIENCE STUDENTS, by F. G. S. Whitfield, F.R.E.S., F.R.M.S., and A. H. Wood, M.A., with foreword by R. Archibald, C.M.G., D.S.O., M.D.; 1935. London: J. and A. Churchill. Crown 4to., pp. 364, with illustrations. Price: 15s. net.

Diary for the Month.

SEPT. 9-14.—Annual Meeting of the British Medical Association in Melbourne.
SEPT. 10.—Tasmanian Branch, B.M.A.: Branch.
SEPT. 13.—Queensland Branch, B.M.A.: Council.
SEPT. 17.—Tasmanian Branch, B.M.A.: Council.
SEPT. 18.—Western Australian Branch, B.M.A.: Branch.
SEPT. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEPT. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 25.—Victorian Branch, B.M.A.: Council.
SEPT. 26.—South Australian Branch, B.M.A.: Branch.
SEPT. 26.—New South Wales Branch, B.M.A.: Branch.
SEPT. 27.—Queensland Branch, B.M.A.: Council.

Medical Appointments.

Dr. A. L. Kinna (B.M.A.) has been appointed Medical Superintendent, Department of Mental Hospitals, New South Wales.

* * *

Dr. G. A. Ross (B.M.A.) has been appointed Deputy Medical Superintendent, Department of Mental Hospitals, New South Wales.

* * *

Dr. J. A. H. McGeorge (B.M.A.) has been appointed Deputy Medical Superintendent, Department of Mental Hospitals, New South Wales.

* * *

Dr. B. H. Lewis (B.M.A.) has been appointed Government Medical Officer at Tumbarumba, New South Wales.

* * *

The undermentioned appointments have been made to the Night Clinic of the Adelaide Hospital, South Australia: Dr. B. H. Burnell (B.M.A.), Honorary Consulting Adviser (Male Section); Dr. R. F. Matters (B.M.A.), Honorary Consulting Adviser (Female Section).

* * *

Dr. A. R. S. Vickers (B.M.A.) has been appointed to act at the Port of Broome, Western Australia, as Medical Inspector of Seamen, Pursuant to the Provisions of section 123 of the *Navigation Act* 1912 *to* 1934.

* * *

Dr. A. R. S. Vickers (B.M.A.) has been appointed, pursuant to the provisions of the *Quarantine Act* 1908 *to* 1924, Quarantine Officer at Broome, Western Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xviii, xix. and xx.

ALFRED HOSPITAL, MELBOURNE, VICTORIA: Honorary Officers.

DEPARTMENT OF PUBLIC HEALTH, WESTERN AUSTRALIA: Medical Officer.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.

MARRICKVILLE DISTRICT HOSPITAL, MARRICKVILLE, NEW SOUTH WALES: Senior Resident Medical Officer.

MENTAL HOSPITAL, NEW NORFOLK, TASMANIA: Sister.

ROYAL AUSTRALIAN NAVY: Medical Officers.

ST. MARGARET'S HOSPITAL FOR WOMEN, SYDNEY, NEW SOUTH WALES: Resident Medical Officer.

THE PRINCE HENRY HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Radiologist.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointment and those desiring to accept appointments to any COUNTRY HOSPITAL, are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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